# REPORT RESUMES

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SEX AND RACE DIFFERENCES IN THE DEVELOPMENT OF UNDERPRIVILEGED PRESCHOOL CHILDREN.

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THIS STUDY WAS UNDERTAKEN TO DETERMINE IF THERE ARE ANY DIFFERENCES IN THE DEVELOPMENTAL CHARACTERISTICS OF UNDERPRIVILEGED PRESCHOOL CHILDREN THAT CAN BE TRACED TO DIFFERENCES IN RACE OR SEX. THE STUDY SAMPLE WAS DRAWN FROM A GROUP OF 368 CAUCASIAN AND NEGRO CHILDREN ENROLLED IN THE SUMMER 1965 PORTLAND, OREGON HEAD START PROGRAM. THE CHILDREN WERE RATED ON SIX INSTRUMENTS, THE BEHAVIOR INVENTORY, PRESCHOOL INVENTORY, AND PSYCHOLOGICAL SCREENING PROCEDURE SUPPLIED BY THE OEO, THE STANFORD-BINET INTELLIGENCE TEST, AND PERCEPTUAL DRAWING AND DEVELOPMENTAL CHART TESTS DEVISED BY THE AUTHOR. A MULTIVARIATE ANALYSIS OF INDIVIDUAL TEST ITEMS WAS MADE TO DETERMINE THE EXISTENCE OF DIFFERENCES BASED ON SEX, RACE, OR SEX-BY-RACE CLASSIFICATIONS. THERE WERE FEW GENERALIZED DIFFERENCES FOUND FOR EITHER SEX OR RACE GROUPINGS. FEMALES SHOWED SOME SUPERIORITY IN CONCEPT DEVELOPMENT, IN APPROPRIATENESS OF SOCIAL BEHAVIOR, AND IN MEAN IQ. NEGROES WERE FOUND TO BE MORE SKILLFUL PHYSICALLY AND TO HAVE BETTER SENSORY PERCEPTION. SOME STATISTICALLY SIGNIFICANT DIFFERENCES ON SPECIFIC ITEMS WERE FOUND FOR SEX-BY-RACE CLASSIFICATION. THE RESULTS OF THE ANALYSES OF INDIVIDUAL TESTS ARE CONTAINED IN EXTENSIVE APPENDIXES. (DR)

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# SEX AND RACE
# DIFFERENCES IN THE DEVELOPMENT OF UNDERPRIVILEGED PRESCHOOL CHILDREN

GARY F. KOHLWES
APRIL, 1966

PS 000737

University of Washington

Abstract

# SEX AND RACE DIFFERENCES IN THE DEVELOPMENT OF UNDERPRIVILEGED PRESCHOOL CHILDREN

by Gary Fredric Kohlwes

Chairman of Supervisory Committee: Professor Maurice F. Freehill
Department of Educational Psychology

An evaluative study was undertaken to determine whether disadvantaged Negro and Caucasian preschool children differed in developmental characteristics classified as social, cognitive, perceptual, or psychological. A secondary objective was to develop an index of group functioning levels in various performance areas which might serve as guides for subsequent curriculum development.

The study was conducted with three hundred sixty-eight children enrolled in an eight-week Project Head Start in Portland, Oregon, during summer, 1965. The study population consisted of children living in areas recognized by school officials and community agencies as poverty pockets. In addition to economic deprivation, schools in these areas were among the lowest in the city on achievement test scores and among the highest in student turnover.

Six instruments were employed to gather data relative to performance and behavior of children. The _Behavior Inventory_, _Preschool Inventory_, and _Psychological Screening Procedure_ were supplied by the Office of Economic Opportunity. The _Stanford-Binet_ was administered by the writer. In addition, two instruments were developed for use

in this research by the writer. Perceptual Drawings evaluated the youngster's quality of reproduction and total approach in response to perceptual tasks. Using behavioral objectives as a guide, Developmental Charts were constructed to assist teachers and aids in undertaking observational study of the performance of children in mental, perceptual, physical, and social development.

A computer program was used which yielded multivariate contingency tabulations for each item on the six instruments. Three analyses were made of all data. First, a comparative tabulation of the performance of Caucasian and Negro children; second, a comparative tabulation of the performance of females when compared to males; and third, a comparative analysis following the division of the study population into four discrete groups by sex and race. The non-parametric chi square test was employed to determine if significant differences existed between any group on the variables investigated.

Conclusions which were drawn concerning sex differences were as follows:

(1) There are few generalized differences on behavior or psychological dimensions by sex.

    (a) Males are more hyperactive than females.
    (b) Females display more thumb sucking behavior than males.

(2) There is some difference in performance by sex in the area of concept development.

    (a) Females are more adept in naming colors than males.
    (b) Females are superior to males in number concept.

(3) Females display more appropriate social behavior than males.

(4) Females attained a higher mean IQ score, as measured on the Stanford-Binet, Form L-M, than the males.

Conclusions which were found relative to race differences were as follows:

(1) There is little generalized difference on behavior or psychological dimensions by race.

    (a) Caucasian children are more often interested in only one or two objects or activities than the Negro children.

(2) Negro children are more skillful on tasks demanding physical coordinative ability than Caucasian children.

(3) Negro children are superior to Caucasian children in sensory perception.

A number of sex-by-race differences were highlighted throughout the study. Significant differences concerning behavior and psychological dimensions were:

(1) Female white children are less disruptive, less provocative, and better able to remain seated than either the male white or male Negro.

(2) There is less stuttering and stammering speech among female Negroes than among male whites.

(3) The male white and male Negro are both evaluated as more happy children than the female white.

(4) Female Negroes have more difficulty interacting with strangers than the male whites.

(5) Female Negroes are more disturbing and disruptive than the female whites.

(6) Female Negroes are more lethargic or apathetic and display less energy or drive than the male whites.

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# SEX AND RACE DIFFERENCES IN THE DEVELOPMENT OF UNDERPRIVILEGED PRESCHOOL CHILDREN

## CHAPTER I

## INTRODUCTION

A national effort is currently under way to provide better educational programs for disadvantaged children. Recent Congressional appropriations earmarked to strengthen and improve the educational quality and opportunities for these children are unprecedented. Never before has American education witnessed an effort of the magnitude presently being waged to modify presumed unsatisfactory conditions.

The national, state, and local attention this problem is attracting is well known. Numerous community action programs have been initiated to spearhead the drive to eliminate inequality of health, education, and welfare. A prerequisite to action should be a clear delineation and understanding of the problem conditions. Unfortunately, many special educational programs presently do not appear to be founded upon any scientific premis regarding the nature of the subjects participating in such programs.

Encouragement for concerted effort directed toward a re-examination of programs for these children comes from many sources. The Educational Policies Commission of the National Education Association (1965) implied that the appropriateness of content in present programs for the disadvantaged might be questioned. Deutsch (1963) contended that not only must an ambitious program of research concerning the developmental processes of these children be initiated, but that new evaluation techniques must be developed for this purpose. Riessman (1962, 1965) also emphasized the need for intensive research concerning the disadvantaged child, particularly that which deals with the various dimensions of his behavioral style. In addition, he indicated that approaches must be based upon the elements of strength of the lower socio-economic group and not upon their weaknesses. Most either overlook or give only passing attention to strengths in the building of educational programs.

For poverty populations traditional educational programs have tended to be inadequate. Perhaps there is a need to examine whether scientific preparation is sufficient to meet the challenge which these groups present. Do they require exceptional educational planning? If so, what are the special characteristics of children which need to be given consideration?

It is suspected that children from less advantaged environments enter school without many of the skills and foundations for learning that other children have acquired. Because of this, their future is believed to be impaired. Many believe that disadvantaged environments offer children a restricted range of experience. As a consequence of this poverty, these children may be a greater distance than more advantaged children from their maturational ceiling. The developmental manifestations of early deprivation, however, are not entirely clear. Until this is known, corrective educational programs will probably not be initiated which promote experiences necessary to activate growth toward specific maturational levels. If programs are to improve the educational position of the underprivileged, they must be constructed in the best available knowledge of the social, cognitive, psychological, and developmental processes and patterns of these children. Then programs may capitalize upon their strengths and provide remedies for their deficiencies.

Many statements concerning disadvantaged children may be challenged regarding broad generalizations made in light of the limited data presented. Discussions concerning language and learning factors, school behavior, and readiness for instruction are frequently held without citing a specific piece of research to supplement and substantiate such descriptions (Ausubel, 1963; Black, 1965). Scientific inquiry into educational problems of culturally disadvantaged children is a relatively recent concern. There have been few research efforts to specify the developmental characteristics of such children. Investigators have seldom made an effort to systematically inquire into the level or structure of functioning of these children. Conclusions have more often been based on casual observation than on findings from research (Shapp, 1963).

Studies of disadvantaged children should place emphasis on the specific deficits and assets of such youth in cognitive learning and in behavioral-psychological development. One author has stated:

> One of the greatest needs in the cognitive learning area is for studies of specific characteristics and processes of learning among disadvantaged children. . . . The general literature is full of assertions about the nature of disadvantaged children's specific learning disabilities, but in most cases systematic documentation is lacking (Wilkerson, 1964, p. 350).

In light of such concern a study designed to investigate the developmental characteristics of disadvantaged children seemed appropriate.

This study investigated sex and race differences in a group of underprivileged preschool children. It was designed to contribute to the knowledge concerning differences between groups of disadvantaged children. The investigation examined the functional level of preschool children in several areas. A variety of measures and techniques were employed to appraise physical, perceptual, psychological, and social attributes and patterns of behavior in a group of predominantly Negro and Caucasian children. A profile of the performance of this group was divided by sex, race, and sex by race to examine the significance of performance variability between various groups.

Hypothesis to be tested. It was hypothesized that the performance of underprivileged preschool children with respect to characteristics classified as social, cognitive, perceptual, psychological, or developmental will vary more with sex than race, and more significantly in those characteristics or traits that are most exactly associated with academic education.

The sample consisted of a group of three hundred sixty-eight preschool children who enrolled in Project Head Start for an eight-week program during summer, 1965, in School District No. 1, Portland, Oregon. Those who participated came from areas of the District identified as having a concentration of low-income families and educationally disadvantaged children. All were required to meet the District entrance requirement for kindergarten in the fall (five years of age on or before November 1).

Educational centers for the program were established in nine locations throughout the city. Each center contained two classes of approximately twenty children each. The group was comprised of forty percent Negro, fifty-eight percent Caucasian, and two percent Oriental. Distribution of Negro and Caucasian pupils was similar in the eighteen classes.

Six instruments in all were employed in the investigation: Stanford-Binet Form L-M, Preschool Inventory, Psychological Screening, Behavior Inventory, Perceptual Drawings, and Developmental Charts. The first is a well-known, individually-administered intelligence test. The next three are examinations which were distributed by the Office of Economic Opportunity and used throughout the nation in Head Start Programs. The last two were developed by the writer for use in this research. The Developmental Charts consist of four observational instruments (mental, perceptual, physical, and social) used by the teachers and aids. The Perceptual Drawings were patterned after materials being used by Ilg and Ames (1965) at the Gesell Institute and examine the child's approach to perceptual tasks as well as evaluating the quality of his reproductions.

Definition of terms. For the purposes of this study the terms underprivileged, educationally deprived, and culturally disadvantaged will be used interchangeably. In general, such children will be defined as those who do not possess readiness for formal school learning and whose social and economic conditions are characterized by low income and poor neighborhood environment.

# CHAPTER II

## REVIEW OF RELATED LITERATURE

In this chapter literature pertaining to sex and race differences in children has been reviewed. Particular attention was given to variables with which this study was concerned. Specific developmental attributes were discussed independently with respect to performance by various groups. As the reader proceeds, it will become evident that there was little research pertaining directly to the issue of sex and race differences among disadvantaged preschool children.

It has been estimated that socially disadvantaged groups make up about fifteen percent of the population of the United States, with their children accounting for as much as twenty percent of the child population (Havighurst, 1964). One authority predicted that by 1970 one in every two children in our large city schools will be deprived (Riessman, 1962). Children beset by environments which provide minimal variety in experience and deficits in selected experiences may benefit from a planned learning experience. An essential precondition for teaching such children is the comprehensive understanding of the learner.

Research effort to study children from our lower socio-economic environment is long overdue. The profiles, behavioral descriptions, and socio-cultural characteristics that have emerged from the literature by no means yield a composite picture (Karp & Sigel, 1965). Investigations, however, are increasing:

> . . . only in the last five or six years has there been a revival of interest in, and subsequently, investigation of, the relationship between salient variables of the social environment and the motivational, intellectual, and personality characteristics of low income children (John, 1964, p. 1)

Of the studies which have been undertaken, most have demonstrated that differential functioning favors the more advantaged groups. Little attention has been given to the view that identified behavior and conditions of socially disadvantaged children be used as information which the school might consider in the design of meaningful and appropriate learning experiences (Gordon, 1965).

### An Overview of the Disadvantaged Child

Articles pertaining to disadvantaged populations make extensive reference to the work of Martin Deutsch at the Institute for Developmental Studies in New York and Frank Riessman at Bard College. However, much of the knowledge possessed by these two psychologists is the result of impressions gained through experience and association rather than from research. Data gained from these media must be subsequently validated through empirically designed studies.

As the result of his study, Riessman (1962, p. 73) identified characteristics which he believed were fairly typical of the deprived child's style: (1) physical and visual rather than aural, (2) content-centered rather than form-centered, (3) externally oriented rather than introspective, (4) problem-centered rather than abstract-centered, (5) inductive rather than deductive, (6) spatial rather than temporal, and (7) slow, careful, patient, persevering (in areas of importance), rather than quick, clever, facile, or flexible.

In a more recent publication Riessman (1963) discussed what he believed were the specific strengths and weaknesses of these children. Among the strengths were: (1) a cooperativeness and mutual aid that mark the extended family, (2) avoidance of the strain accompanying competitiveness and individualism, (3) equalitarianism, informality, and humor, (4) freedom from self blame and parental overprotection, (5) children's enjoyment of each other and lessened sibling rivalry, (6) the security found in the extended family and a traditional outlook, (7) enjoyment of music, games, sports, and cars, (8) ability to express anger, (9) freedom from being wordbound, and (10) the physical style involved in learning.

Specific areas of weaknesses were identified as : (1) poor auditory attention, (2) poor time perspective, (3) inefficient test taking skills, and (4) limited reading ability.

At least three persons have expressed concern with the seemingly progressive retardation which appears to characterize the educational performance of disadvantaged children (Deutsch, 1963; Gray, 1962; John, 1964). Teachers as well have observed that upon entering school these children do not display the adverse behavior patterns which are likely to characterize the group in the intermediate grade classrooms. What happens within the school during the first four or five years of school? Gray undertook an extensive review of the findings of researchers in an effort to explain this phenomena. She found some consistency of evidence, with most associating the regression of behavior and educational performance to attitudes, motivation, or the absence of goal directed behavior. Awareness of this condition motivated Ausubel (1963) to postulate that "the learning environment of the culturally deprived child is both generally inferior and specifically inappropriate."

The identification of inherent personality differences between the Negro and Caucasian is still open to question. The impact which cultural influence has upon the overt behavior is uncertain.

> There has been little satisfactory evidence presented on the question of whether or not there are characteristic personality differences between Negroes and whites in our society. The few studies using questionnaires or projective methods have been based on samples that are probably not typical, and they have shown no clear trends. There may be some interesting questions in this area, but so far there is not much to be said about them (Tyler, 1956, p. 302).

There has not been much progress made toward answering the question concerning personality differences since 1956.

Individual differences cannot be ignored or abandoned in programs for the disadvantaged merely because a search for characteristic "patterns" is undertaken. Differential psychology is undoubtedly as important with this group as with any other. Deprivation understandably manifests itself in a variety of ways. Once an appropriate foundation program is initiated which more adequately recognizes the limitations of traditional programs, individual considerations can be initiated.

## Intellectual Capacity of Negro and Caucasian Youth

The controversy over the comparison of the intelligence of the American Negro and Caucasian youth is one of long standing. At the turn of the century the prevailing thought was that the white was unquestionably superior to all other races. With the exception of but a few (Feingold, 1924; Hirsch, 1926; Garrett, 1965; Shuey, 1958), research since that time has tended to cast doubts upon the innate superiority of any race. Characteristics once thought to be entirely determined by heredity have been found to be subject to environmental influences.

One of the most recent efforts to investigate the validity of claims by the few holding for innate differences among ethnic groups was undertaken by Tumin (1963). In his publication a psychologist, sociologist, anthropologist, and testing authority appraise the issue from their professional viewpoints. The four scientists are in substantial agreement that the claims advanced by those advocating innate superiority cannot be supported by any substantial scientific evidence. Furthermore, they conclude that claims regarding differences in native intelligence between Negroes and whites cannot be substantiated unless three conditions are met:

> (1) The distinctive genetic, or "racial" homogeneity of the Negro group being tested, as well as that of the white group being tested, must be demonstrated, not assumed.
>
> (2) The social and cultural backgrounds of the Negroes and whites being tested or otherwise being measured must be fully equal.
>
> (3) Adequate tests of native intelligence and other mental and psychological capacities, with proven reliability and validity, will have to be used. (Tumin, p. 9)

Shuey found that the least difference (about 10 IQ Points) between IQ's of white and colored children appears at the preschool level. If one assumes that these and other differences that are obtained in the measurement of intellectual functioning (Klineberg, 1935; Pintner, 1937; Shuey, 1958) are not differences in innate capacity then how do we account for this discrepancy? Most psychologists have attempted to examine this phenomena either through an examination of environmental antecedents or the characteristics of the testing situation itself (John, 1964).

Pasamanick and Knobloch (1958) studied prenatal and paranatal factors within various socio-economic strata of the population. Their findings indicate that there is a significantly large number of organically injured Negro youth who, in addition, must contend with the other consequences of their social-cultural disorganization. They suspect that apparent racial differences in intelligence and achievement in school may be the result of environmentally induced prenatal neurological damage in Negro and lower class children.

Klineberg (1935) and Lee (1951) have offered definite evidence as to the effect that an improved environment can have in raising test scores. Negro subjects were found to raise their average on intelligence tests following exposure to more adequate educational opportunities. A positive relationship exists between the length of residence in more favorable circumstances and average group performance on measures of intelligence.

Various individuals have investigated the extent to which factors within the testing situation itself can produce changes in scores. Canady (1936) found that there was a slight tendency for children to score higher when tested by an examiner of their own race. Pasamanick and Knobloch (1955) noted that an examiner of different race caused sufficient inhibition to result in decreased verbal responsiveness and thus poorer performance on language sections of IQ tests. The extent of an examination's "cultural bias" has been found by Eells (1953) to be of significance. Such conditions often cause the children from deprived backgrounds to receive scores which are inaccurate reflections of their basic intelligence. In contrast, McGurk (1953) found no significant difference between the performance of Negro and white high school students on questions which had been pre-sorted into categories of "cultural" and "non-cultural" by seventy-eight judges. In fact, he found more difference between the groups on the non-cultural items. Similarly, contrasting data exists regarding the effect that timed exercises have upon the performance made by the two groups. Research by Moore (1941) and Rhodes (1937) failed to find significant Negro-white differences, while studies by Klineberg (1928) revealed some variability in psychomotor speed. The poorer performance of American Negro children on perceptual and spatial tasks was explained by Anastasi (1961) on the basis of speed. As a result of this conflicting testimony Tyler (1956) concluded that there was little evidence that explained in terms of factors peculiar to the test situation to account for the Negro-white differences that are consistently reported.

A recent article in the Journal of Negro Education attacks the position taken by those who continue to interpret measured differences on intelligence test scores by Negroes and whites as reflections upon native capacity (Pettigrew, 1964). A case is built for three hypotheses:

(1) In environments which approach being equally restrictive for children of both races, the intelligence test means of both will be low and approach equality.

(2) In environments which approach being equally stimulating for children of both races, the intelligence test means of both will be high and will approach equality.

(3) When any racial group moves from a restrictive to a comparatively stimulating environment, its measured intelligence mean will rise.

## Perceptual Functioning of Young Disadvantaged Children

The extent to which perceptions are possible is a function of the individual's direct experience with environmental factors. Some have more advantageous opportunities than others. Snygg and Combs (1959) have identified the major sources of concrete experiences as: (1) natural scenes--the geographic and geologic features, (2) constructions of man, (3) world of living things, (4) experience of the self--one's own physical, emotional and thinking being, and (5) interaction with others. Gibson (1963) builds a convincing argument that perceptual development progresses as the result of both maturation and learning. She is not convinced, however, that the spotty available research contributes adequately to a theoretical perspective.

A child's perceptual development begins very early and takes place through the sensory modalities of vision, hearing, touch, taste, and smell (Bloom, Davis, & Hess, 1965; Piaget, 1959). Perceptual development is stimulated by the environment to the extent that rich experiences are available. Bloom contends that by the beginning of the first grade, the differences in the degree of perceptual development between culturally deprived and more advantaged children depends upon the amount and variety of preschool manipulative and interactive experiences.

It is widely recognized that these youngsters when compared with middle-class children have fewer manipulative objects, less diversity of play equipment and an absence of visual stimulation during their preschool years. Yet, the impact that these seemingly adverse conditions have upon visual perception is only speculative. If differences do exist, they are not due to inferior organs but rather inferior habits of hearing, seeing, or thinking (Havighurst, 1964).

At the age of five children can make crude differentiation of linear from curvilinear shapes but cannot differentiate within these groups (Gibson, 1963). Deutsch and Katz (1963) administered the Wepman test to a large group of young children in the first grade and found significant differences in auditory discrimination between lower-class and middle-class children. These differences appeared to diminish markedly as the children become older. In addition to inferior auditory discrimination among deprived children, Deutsch and Katz believe that there is some deficit in visual discrimination and inferior judgment concerning time, number, and other basic concepts.

More psychomotor disorders and greater reading disability were found in the deprived population than in more privileged groups (Pasamanick & Knobloch). Conceptual ability, which is dependent upon perceptual functioning (Russell, 1956), has been evaluated as being characteristically weak among the lower class child (Montague, 1964; Siller, 1957). According to McCandless (1952) the disadvantaged child tends to be more concrete and inflexible in his intellectual functioning than does the more advantaged child. Higher social class children perform significantly better than lower social class children in the acquisition of arithmetic concepts in kindergarten (Montague, 1964). Arithmetic scores are higher than reading scores in a population of lower class children, although they are still below national norms (Deutsch, 1963).

In her review of research on the characteristics of children from low income backgrounds, Vera John (1964) found no studies demonstrating significant variations in sensory threshold, or sensitivity, according to the social class of young children. While the experimental data is sparse, opinions relavent to the issue tend to reflect two impressions. First, the keenness of the senses seems to be about on a par in the various races of mankind (Jenkins & Paterson, 1961); second, any observed differences depend heavily upon the training of powers of observation (Klineberg, 1928).

## Cultural Influences Upon the Behavior of Children

There is reason to suspect that the awareness of cultural differences comes very early in the life of the Negro child (Radke & Trager, 1950). They begin very early to order stimuli by similarities and differences, particularly with respect to self-discriminations and awareness of social inequalities. Compensatory devices and defense mechanisms subsequently emerge to combat the realization of the devalued position. Yet, preschool children enter school with neutral attitudes, free of the hostility, aggression, and disturbing behavior that comes either with age or experience in school (Clausen & Williams, 1963; Grossak, 1965). It is between the ages of five and eight that the Negro child becomes increasingly aware of his social devaluation. A rather natural consequence of this awareness is defense reactions, negative self-feelings, and group conflict (Clausen & Williams, 1963). Since the deprived child will have had only minimal training in the conventional manners and social skills of the middle class, he will be unskilled in communicating socially with his peers or to authority figures. Consequently, he will lack ability to function effectively in a school group (Olson & Larson, 1965).

Ego development of disadvantaged children includes low self-esteem, impaired patterns of personal-social organization, high incidence of behavioral disturbance, and distorted interpersonal relationships (Gordon, 1965). They have been characterized as having difficulty in accepting personal responsibility (Ausubel & Ausubel, 1963; Goff, 1954), possessing devaluing self-concepts (Keller, 1963), and behaving in an aggressive fashion (McKee & Leader, 1955). Ausubel and Ausubel (1963) have indicated that disadvantaged children depend more on external than internal control.

A doctoral dissertation by Margolin (1963) examined the extent to which group awareness existed in kindergarten. The results indicated that children at the kindergarten level respond as individuals, but not to group norms, group control, or status definition. She speculated that the process of socialization as children get older may contribute to competitive behavior.

## Individual Differences Between Male and Female Preschool Children

Studies of young children tend to agree that there is more violent and disrupting behavior among preschool boys than girls. Evidence seems to be rather conclusive, whether it results from observational studies (Dawe, 1934; Jersild & Markey, 1935; Siegel, 1956), rating studies (Beller, 1962; Hattwick, 1937), experimental studies (Bandura, Ross, & Ross, 1961; Hartup & Himino, 1959), or projective testing (Bach, 1945; Sanford, 1943). In investigations where the differences did not reach significance the incidence of aggressive behavior was higher among boys than among girls. The exceptions appeared to occur when verbal aggression was being evaluated as contrasted with physical aggression (Durrett, 1959).

Research related to dependency behavior in nursery school and kindergarten children has yielded conflicting results regarding sex variability. Beller and Neubauer (1958) found more girls than boys coming to clinics for assistance having overdependence as a symptom. Girls tend to be more dependent upon the teacher (Hattwick, 1937; Marshall & McCandless, 1957; Sears, Whiting, Nowlis, & Sears, 1953). In turn, succorance and nurturance are considered femine needs by teachers (Sanford, 1943). Boys, on the other hand, have been evaluated significantly higher on measures of negative attention getting (Goodenough, 1929) and show more upset behavior at being separated from their mother (Siegel, 1959).

Girls at all ages tend to be more interested in interpersonal relations and make higher ratings on sociometric measures than boys (Marshall & McCandless, 1957; Tuddenham, 1952; Winker, 1949). As a group they speak earlier than boys (Gesell, 1940; Terman, 1925), use more articulate speech (Beller & Neubauer, 1958; McCarthy, 1930), and display more verbosity and verbal fluency (Jersild & Ritzman, 1938; Young, 1941). Girls use longer sentences at an earlier age than do boys (Jersild & Ritzman, 1938; McCarthy, 1930; Smith, 1935). Females of preschool age also make fewer grammatical errors (Davis, 1937; Smith, 1935). Studies of vocabulary proficiency of young boys and girls are inconclusive (McCarthy, 1930; Templin, 1957).

An analysis of the standardization data on the Stanford-Binet Scale by McNemar (1942) indicated that girls perform better on a number of independent tasks up until age five and one-half years and receive higher total evaluation scores. Girls were better in picture memories, counting, paper folding, buttoning, aesthetic comparisons, and matching objects. These observations substantiate earlier findings of Buckingham, Gesell and MacLatchy (1930). Buckingham et al. found that upon entering first grade girls were more proficient in counting and number identification. They counted higher and made fewer errors at all ages between two and six. Williams (1964) studied the extent to which kindergarten children ascertained certain mathematical concepts, skills, and abilities to determine the relationship of such achievements to various psychological and sociological factors. Using

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the Preschool Kindergarten Modern Mathematics Test he found that there was no significant difference in mathematical achievement mean scores between boys and girls when the factors of mental maturity and socioeconomic status were controlled. He did, however, find that a significant relationship existed between mathematical achievement and rote counting ability, singing songs involving numbers, and knowledge of age, house number, and telephone dialing.

Gesell (1940), however, identified two areas in which the boys outperformed the girls during the preschool period; boys could traverse a walking-board more quickly and with fewer errors than girls, and they could throw with better stance and more accuracy.

The comparative performance by preschool boys and girls on perceptual tasks seems unclear. Tyler (1956) has stated that she believes sex differences are negligible in sensory characteristics, such as hearing, eyesight, taste, and smell. Koch (1954) found no sex differences in perceptual speed or spatial performance upon using the Primary Mental Abilities Test with five and six year old children. Gesell (1940) found no differences in performance by boys and girls on the Kuhlman-Terman Geometric Form Recognition Tests or other form recognition tests. In contrast, studies being carried out at the Gesell Institute for Child Development using perceptual and motor tasks with young children indicate that girls are superior and show greater maturity of response regardless of the test used or the age of the subjects (Ilg & Ames, 1965).

One of the few comprehensive studies undertaken which dealt with race as well as sex variables was reported by Anastasi and D'Angelo (1952). A group of one hundred children age four and one-half to five and one-half attending day nurseries were administered the Goodenough Draw-A-Man Test. In addition, a recording was made of each child's responses in a standard test situation. The sample was mostly from the lower socio-economic class with the proportion of male and female, Negro and Caucasian about equal. The girls' performance was superior on the Draw-A-Man Test. In the analysis of the language sample, sex by race was the significant interaction; white girls were superior to white boys, while Negro boys were superior to Negro girls. The findings relative to the performance on the Draw-A-Man Test are consistent with those found earlier by Gesell, who demonstrated that girls include more details than boys on both drawing a man and on the incomplete drawing test.

The emotional behavior of preschool children age thirteen months to six years was recorded by psychologists during the administration of mental tests (Goodenough, 1929). The children were rated on shyness, negativism, and distractability by examiners immediately following the administration of the standardized tests. In a sample of nine hundred ninety children the examiners found no sex differences for the group. They did, however, find that there was a trend toward improvement with age in all variables. Lower class boys were the least shy of all.

Clinical records of Beller and Neubauer (1958) gained from intake sessions with parents during diagnostic interviews, lend evidence that parental accounting of child behavior may be valid observations. An analysis of over 100 records indicated more hyper-aggression, hyperactivity, and speech disturbances for boys. Girls were reported by parents to have significantly more problems of overdependence, emotional overcontrol, and sibling rivalry.

## Summary

Variability in the social, cognitive, psychological, and developmental patterns of preschool boys and girls has been rather clearly established. Psychologists' preoccupation with the study of individual differences since before the turn of the century has yielded experimental evidence relative to many aspects of developmental function. In general, it has been found that females excell males in performance during the preschool years. This is especially evident in areas which educators traditionally value as being desirable prerequisites to participating in formal educational programs (verbal facility, number concept, memory, conforming behavior, and social adjustment).

There is little information relative to the comparative performance by disadvantaged boys and girls during the preschool years. In the absence of contrary evidence, there is reason to believe that among a population of disadvantaged children that the girls would similarly out-perform the boys, particularly in behaviors associated with academic education.

Differences in performance between male and female have been more pronounced and more clearly established than differences between Negro and Caucasian. Frequently, information gained from race comparison studies cannot be generalized. There is reason to assume comparative performance by sex in poverty populations would yield greater variability than racial comparisons.

# CHAPTER III

## EXPERIMENTAL DESIGN

Educators have long speculated upon the value which preschool educational programs can hold for children deprived of rich early life opportunities and experiences. In general, problems inherent in the financing of such programs have persisted as an insurmountable obstacle. Federal support is now making early childhood education possible. Project Head Start was introduced scarcely one year ago. This community action program, administered by the Office of Economic Opportunity, made it possible for some 561,000 children in 2,398 communities throughout the United States be given preschool experiences during summer 1965 (Office of Economic Opportunity, 1965).

A program was developed on the basis of knowledge concerning growth and development of young children, theoretical and research publications regarding children living in poverty areas, and observations of children from lower socio-economic environments. Specific objectives and learning activities were set forth through the combined effort of teachers, supervisors, and curriculum specialists in the general areas of physical development, social development, mental development, perceptual development, and development of self concept. The guidelines provided a succession of events while allowing for flexibility depending upon the response of the children.

School District No. 1, Portland, Oregon, received a grant of $63,329 to conduct an eight-week, pre-kindergarten Head Start program for 368 boys and girls. Eighteen classes were located in nine centers, with each classroom staffed with a certificated kindergarten teacher and three aids. Children attended class from 9:00 a.m. until 12:15 p.m., including a lunch period.

Federal funds were not available to the applicants for research or evaluation of their independent programs. With the support and assistance of the District it was possible for the investigator to implement an evaluative study of Portland's Operation Head Start. The District was desirous of receiving assistance in at least two ways: first, to develop an index of group functioning, levels of competency in performance areas which might serve as guides for subsequent curriculum development; and second, to test for differences in performance of Negro and Caucasian, male and female.

## Selection and Description of the Sample

The grant awarded to the Portland School District specified that at least 90 percent of children selected to participate in the program must come from geographic areas designated as being impoverished. A small percentage of more advantaged children were included in order to provide some spread of socio-economic groups in each class. It was believed that experiences of children from poverty areas may be extended by providing the opportunity for association with children of other socio-economic groups.

Children selected to participate in the program came primarily from areas recognized by school officials and community agencies as poverty pockets. In addition to economic deprivation, schools in these areas were among the lowest in the city on achievement test scores and among the highest in student turnover. The mean performance of some elementary school populations in achievement fell as much as two to three standard deviations below the city average.

Names of children who were eligible to participate in Operation Head Start were obtained from school registrations, kindergarten orientation, social workers, school nurses, and the public welfare department. After contacts had been made with the families of these children by letter it was often necessary to visit the home in order to explain the anticipated program and encourage the enrollment of the child. Thus, a sample of 368 children coming from disadvantaged areas who were given permission by their parents to participate was secured. This should not be interpreted as a random sample of disadvantaged children. However, since there is no indication that attendance in future programs will become compulsory, or that the procedures of enrolling youngsters will be modified significantly, the sample obtained becomes more important for the purpose of research in Portland than had it been a random one. Research conducted with a random selection of children would likely yield profiles of functioning which would distort the actual educational program necessary upon subsequent program offerings.

Head Start participants came from essentially two districts. The Albina district, in the north-central part of Portland, has been identified by all agencies as the area of greatest need. Statistics compiled by the Community Council (1964) illustrate some of the conditions which concern Portland residents. There is a Negro population of 71.8 percent in this area. Over 27 percent of the housing has been rated as "unsound." In this district 24.2 percent of the families have an annual income of less than $3,000. Unemployment is 50 percent higher than for the remainder of the city. Out of the total population of 37,500 in the Albina district, 4,000 are welfare recipients.

The Brooklyn-Buckman-Sunnyside district, in the south-central area of Portland, has been identified by the Portland Community Council as the area next in need to Albina. While the Negro population is small (1 percent), all other data approaches that of the Albina district. Out of 4,499 families living in this area at the time of the 1960 census, 1,025 families or 22.8 percent had annual incomes of under $3,000. Over 30 percent of the housing units in this district have been appraised as substandard.

### Data Gathering Instruments: Behavior Inventory

Three instruments were developed and distributed under the auspices of the Office of Economic Opportunity. They were administered in all Head Start Programs throughout the Country during summer 1965. The Behavior Inventory was administered two times, during the second and eighth week of class. For the purposes of this study only results from the pre-test administration were utilized.

A random sample of approximately one-third of the children were given the examination. Teachers were instructed to list their children alphabetically and to check the first name and every third name thereafter. The children whose names were checked were those selected to be given the examination.

Children were evaluated on a four point scale ranging from "very much like" to "not at all like" on fifty behavior variables on the basis of personal observation and experience with the child. In effect, the teachers describe as accurately as possible how the child behaves.

Generally the evaluations given a particular child were the result of a composite appraisal by the teacher and three aids.

Evaluations were recorded by the teachers on IBM 1230 answer sheets. Due to extraneous markings which interfered with interpretation from the original answer sheets, it was necessary to hand copy and verify new ones on extra forms which were available. IBM cards were produced directly from the transcribed answer sheets and analyzed using the IBM 1620 data processing equipment. From the contingency table printouts a chi square analysis was performed. For the purposes of the analysis, the four scales were condenced into two. One combined the "very much like" and "somewhat like" responses; the other the "very little like" and "not at all like" responses. The analysis design for a 2 x 2 table was then applicable to the data. The reliability of measurement was believed to be enhanced by not expecting teachers to make the more discriminating qualitative appraisal.

Preschool Inventory

The intent of the Preschool Inventory, developed by Bettye M. Caldwell (1965) and distributed by the Office of Economic Opportunity for use in Head Start Programs, was to identify which concepts a child possessed and in which ones he was deficient. These data in turn provide a foundation for programs in the Head Start summer enrichment.

> This Inventory is designed to find out whether the child has acquired certain skills that are ordinarily observable in children by the time they are five or six years of age (Caldwell, 1965, p. 1).

This 161 item Inventory was specifically designed so that it could be administered by a person with minimal familiarity with procedures used in standardized testing (teachers, teacher-aids, or trained volunteers).

The scoring system was designed so that a minimum of interpretation would be required by the examiner. It was administered individually and enforced no time limits.

The Inventory was administered to the same children as drawn in the sample given the Behavior Inventory. It was administered during the second week of the program, in most instances by the head teacher. A child's performance was initially recorded in an answer booklet and later transferred by the examiner to IBM 1230 answer sheets.

Due to an error in programming, items 124 through 134 and 149 through 161 were not included in the item analysis. In the process of attempting to interpret the multiple responses to questions 124 through 134 from the 1230 answer sheets these data along with that being interpreted simultaneously (items 134-149) were lost. The remaining items were subjected to a chi square analysis by sex, race, and sex-by-race.

## Psychological Screening Procedure

All children were appraised on the Psychological Screening Procedure, the last of three instruments provided by the Office of Economic Opportunity for use in all Head Start Programs. The examination was performed by the head teacher after at least four weeks with the students. There are two parts to the examination: symptom check list and child description check list.

The symptom check list is composed of thirty symptom names which relate to aspects of psychological development in children. Teachers indicated which symptoms were characteristic of the child's behavior. They were instructed not to mark any behavioral symptom as characteristic which occurred two times or less.

The child description check list is a series of nine descriptive paragraphs about children. Descriptive categories range from "the isolated child" to "the disruptive child." Once again, teachers identified those categories which they believed characterized a child's behavior during the course of the program.

Teachers recorded their responses directly on IBM 1230 answer sheets, which were interpreted and punched into cards. These, in turn, were converted into contingency tables. From the tables a chi square analysis was performed for each item by sex, race, and sex-by-race.

## Developmental Charts

This instrument was designed and developed specifically for Project Head Start in School District No. 1 by the writer. Objectives for the Program, stated in terms of behavior observations of children, were developed by curriculum personnel in the District. Using these as a guide, charts were developed in four areas to examine the extent to which children displayed the particular behavior prior to their participation in a pre-kindergarten program. During the second week of the eight-week program the head teacher and three aids made a composite appraisal of their children in four areas; mental development, perceptual development, physical development, and social development.

The number of appraisals necessary on any single evaluation instrument ranged from fifteen to twenty items. They were scored in a pass-fail dichotomy according to scoring criteria which were provided. Although items were grouped together in one of four areas, the relatedness of the items contained in each group was not assumed. At this point they are essentially discrete observations of behavior, placed under one of the four headings through subjective appraisal and by inference from the literature. The examination forms and scoring criteria are reproduced in Appendices D, E, F, and G.

A four-hour training session was conducted by the investigator for all teachers and aids to familiarize them with the instrument. At that time each item was independently discussed with respect to administration and scoring standards. Techniques regarding the motivation of children and reduction of test anxiety through the development of rapport were examined.

Key punch operators were employed to convert the results recorded on answer sheets into IBM cards. Contingency tabulations were obtained for each of the four charts. A chi square analysis was performed by sex, race, and sex-by-race to test for significance the difference in performance by discrete groups.

## Perceptual Drawings

This examination was developed by the investigator specifically for the Project, but follows closely work being carried out by Ilg and Ames (1965) with behavior tests at the Gesell Institute of Child Development. Children were asked to produce letters and numbers, and to reproduce seven different drawings, ranging in difficulty from the circle to the vertical diamond. In addition to the appropriateness of a child's perceptual development, as indicated by the quality of his reproductions, the total approach in response to the perceptual task was recorded. Consequently, data were obtained regarding the orientation, directionality, and varying approaches to perceptual tasks by disadvantaged children. Scoring criteria to appraise the quality of the reporductions were drawn from those outlined by Ilg and Ames (1965) and by Terman and Merrill (1960).

A total of 290 children were given this individually administered perceptual examination. The design was to examine each child in the program, although it was not possible to reschedule testing dates if individuals were absent from school on the day of examination. The examination required from ten to fifteen minutes per child and was performed at the center where the child was regularly enrolled. Immediately following the administration, the examiner transcribed onto the child's examination sheet the notation necessary to record how the child approached the tasks. Each child's paper was subsequently scored and recorded on a master worksheet from which key punch operators produced IBM cards summarizing the performance. A chi square analysis was then undertaken to examine the comparative performance made by mutually exclusive groups identified by sex, race, or sex-by-race.

The Instructions for Use with Perceptual Drawings, reproduced in Appendix H, summarize the evaluations which were made of each child's perceptual drawings. The investigator made all the appraisals during a one-week period following the termination of the eight-week class session.

### Stanford-Binet Scale, Form L-M

This examination needs little introduction. Revised in 1960, the Form L-M has retained many of the features of the original 1916 publication (Terman & Merrill, 1960). It eliminated many of the structural inadequacies of the 1937 scale and combined the two forms into one. Several changes in content were made by eliminating some of the less adequate subtests, relocating items otherwise satisfactory, and by reappraising the scoring and difficulty of each item. In short, tests within the examination are arranged in order of difficulty by age levels, with the individual's "score" representing a measure of intelligence.

> The Stanford-Binet scale is an instrument efficiently designed . . . providing a single score describing the child's present level of general intellectual ability. It is interesting to the child, precise, and well standardized (Cronbach, 1960, p. 188).

The Stanford-Binet was administered by the investigator to a total of one hundred one children during a four-week period in summer 1965. Out of this number one was eliminated as being unreliable and three which were administered to Oriental children were not included in the analysis, leaving a total pool of ninety-seven examinations. In this sample were forty-nine female and forty-eight male; fifty-six Caucasian and forty-one Negro. The sample was the random selection which had been made for purposes of administration of the Preschool and Behavior Inventories. Children were examined in the center at which they were enrolled. Those who were included in the sample that were not administered the test were either absent or scheduled for medical and/or dental appointments on the days which the center was visited.

An abbreviated scale was administered by using the starred tests of the L-M scale. Four tests were administered at each age level rather than the usual six. Credit allowance for passing scores on items was prorated accordingly. Research has indicated that this abbreviated method yields scores which compare favorably with those obtained from complete test administration (Anastasi, 1961; Kennedy, Van De Riet & White, 1963; Terman & Merrill, 1960). Kennedy _et_ _al_., (1963) obtained a Pearson product-moment correlation of .99 between the mental age scores on the full and abbreviated scores for a sample of 1,800 Negro children who were stratified according to age, sex, grade, socio-economic status, and community size. This would tend to indicate that the abbreviated scale is adequate for research purposes.

Using key punch operators, the results of the examinations were punched into cards from the examination booklets. Variability in student performance made it necessary to record the results of each youngster from Year III-6 through Year X. In addition to a student identification number, the sex, race, chronological age, mental age, intelligence quotient, basal age, and ceiling age were entered for each child.

Data were analyzed by sex, race, and sex-by-race using the IBM 1620 computer. Contingency tabulations were received for each group on each test item. From this record a chi square analysis by item was performed. In addition, the mean and standard deviation of attained IQ scores were computed for each discrete group. A $t$ test was undertaken to test for significant differences between the means of the various groups.

## Speech and Language Examination

An examination to evaluate the speech and language development of children participating in Project Head Start was constructed through the combined effort of the Supervisor of Speech and Hearing for the Portland Public Schools and the writer. This examination, constructed during spring, 1965, was a developmental (age level) profile based on the performance of children in five areas: syntax, motor skills, speaking, language comprehension and expression, and condition of the oral structure and musculature.

Twelve speech and hearing therapists were employed to administer the examination to one hundred ninety children prior to participation in the Program. These therapists administered the examination a second time as a post test in September 1965 to one hundred forty children.

Following analysis of these data the decision was made to not use the results. Three factors were instrumental in bringing about this decision: (1) the examination items were found to be far too easy for the sample with which it was used, (2) there was a discrepency in the use and understanding of the scoring criteria which were employed and (3) a computer check on reliability of administration yielded evidence indicating that the results were not reliable. The examination is currently being revised for future utilization.

Analysis of Data

All data were analyzed in part through data processing. Data gathered from the Preschool Inventory, Behavior Inventory, and Psychological Screening Procedure were converted to IBM cards via the IBM 1230 interpreter. The remaining three instruments were likewise converted with the assistance of statistical clerks and/or key punch operators. All materials were processed through the Computer Center at the University of Oregon using the IBM 1620 Data Processing System.

A computer program developed at the Computing Center at the University of British Columbia (Sokol & Dempster, 1964), which yields multivariate contingency tabulations, was selected for the initial phase of data analysis. The output is a bivariate table of tabulations for each item on all six instruments, along with a second table which converts these tabulations into vertical percentages. Any breakdown of comparison is possible providing that each group is mutually exclusive.

For the purpose of this study three analyses were made of all data. First, a comparative tabulation of the performance of Caucasian and Negro children; second, a comparative tabulation of the performance of females when compared to males; and third, a comparative analysis following the division of the population into four discrete groups by sex and race. Table 1 shows a reproduction of the three computer printout forms which were received for a Stanford-Binet item (Number concepts, Year IV). Similar data were received for each test item on the six instruments.

Data which were gathered regarding underprivileged children on the six instruments are essentially discrete observations of behavior. Although the individual items represent a cross section of behavior, assumptions should not be made regarding their relatedness or the presence of a continuous scale. The pass-fail dichotomy of the data along with knowledge that the sample was skewed by selection led to preference of the non-parametric chi square test for significance.

Upon receiving the computer printout of the contingency tables a chi square statistical test was undertaken for each item to determine the relationship between the two variables being compared. The results from a contingency table are subjected to statistical manipulations to determine whether they should be attributed purely to chance or whether they actually describe a significant relationship between two variables. The general formula for chi square is (Crabtree, 1962):

$$\chi^2 = -\frac{(f_o - f_t)^2}{f_t} \qquad (3.1)$$

where: $\chi^2$ = symbolizes Chi Square.
$f_t$ = the theoretical frequency.
$f_o$ = the observed frequency.

## Table 1

## Illustrative Computer Printout
## (Number Concepts, Year VI, Stanford-Binet)

Comparison by Sex

```
   *    0     1  *
***********************
0  *    0     0  *     0
1  *   40    29  *    69
2  *    8    20  *    28
***********************
   *   48    49  *    97

VERTICAL PERCENTAGES.

   *    0     1  *
***********************
0  *   .0    .0  *    .0
1  * 83.3  59.2  *  71.1
2  * 16.7  40.8  *  28.9
***********************
   *   48    49  *    97
```

Note.—

| Horizontal | Vertical |
|---|---|
| 0 Male | 0 Omit |
| 1 Female | 1 Fail |
| | 2 Pass |

Comparison by Race

```
   *    0     1  *
***********************
0  *    0     0  *     0
1  *   40    29  *    69
2  *   16    12  *    28
***********************
   *   56    41  *    97

VERTICAL PERCENTAGES.

   *    0     1  *
***********************
0  *   .0    .0  *    .0
1  * 71.4  70.7  *  71.1
2  * 28.6  29.3  *  28.9
***********************
   *   56    41  *    97
```

Note.—

| Horizontal | Vertical |
|---|---|
| 0 Caucasian | 0 Omit |
| 1 Negro | 1 Fail |
| | 2 Pass |

Comparison by Sex and Race

```
   *    0     1     2     3  *
***********************************
0  *    0     0     0     0  *     0
1  *   23    17    17    12  *    69
2  *    4    12     4     8  *    28
***********************************
   *   27    29    21    20  *    97

VERTICAL PERCENTAGES.

   *    0     1     2     3  *
***********************************
0  *   .0    .0    .0    .0  *    .0
1  * 85.2  58.6  81.0  60.0  *  71.1
2  * 14.8  41.4  19.0  40.0  *  28.9
***********************************
   *   27    29    21    20  *    97
```

Note.—

| Horizontal | Vertical |
|---|---|
| 0 Male Caucasian | 0 Omit |
| 1 Female Caucasian | 1 Fail |
| 2 Male Negro | 2 Pass |
| 3 Female Negro | |

The computation of chi square from a 2 x 2 table has been outlined by Guilford (1965). Discrete group comparisons on individual items made it possible to utilize this technique in computing a large number of the desired statistical tests. This procedure for chi square from a four-cell, 2 x 2 table was applicable when examining the performance of Caucasian and Negro, male and female, and the six combinations of discrete groups by sex and race when the individual items were interpreted in a pass-fail dichotomy. The symbolic arrangement of data in a contingency table and formula are as follows:

Table 2

Symbolic Arrangement of Data
in a 2 x 2 Contingency Table

Variable II

|  |  | Higher | Lower | Both |
|---|---|---|---|---|
| Variable I | Higher | a | b | a + b |
|  | Lower | c | d | c + d |
|  | Both | a + c | b + d | N |

$$\chi^2 = \frac{N\,(ad - bc)^2}{(a + b)\,(a + c)\,(b + d)\,(c + d)} \tag{3.2}$$

Yate's correction for continuity was applied as a precautionary measure in instances where any cell frequency was less than ten. Guilford has advised that "when we apply chi square to a problem with 1df and when any cell frequency is less than 10, we should apply a modification known as Yate's correction for continuity." This correction tends to reduce each obtained frequency that is greater than expected and to increase by a like amount each which is less than expected. Applying this principle alters the chi square formula used with data in a 2 x 2 table (Edwards, 1963).

$$\chi^2 = \frac{N\left(|bc - ad| - \frac{N}{2}\right)^2}{(a + b)\ (a + c)\ (b + d)\ (c + d)} \qquad (3.3)$$

Since a number of the evaluations made during the administration of the Perceptual Drawings were concerned with multiple approaches to perceptual tasks, several items on this instrument were not appraised in the pass-fail dichotomy. Consequently, it was necessary to compute a theoretical frequency for each observed frequency in the multi-celled contingency table prior to computing the chi square analysis. The theoretical or expected frequency is one which would be most likely to occur if the relationship were due purely to chance. A theoretical frequency was computed and recorded for each cell through application of the following formula (Crabtree, 1962).

$$f_t = \frac{r_t \cdot k_t}{N} \qquad (3.4)$$

where: $f_t$ = the theoretical frequency.
$r_t$ = the total of the row in which the cell falls.
$k_t$ = the total of the column in which the cell falls.
$N$ = the grand total for the table.

Once the theoretical frequencies were computed, the value of chi square was determined by use of the general formula (3.1).

Additional statistical computations were performed with the results of the Stanford-Binet administration. The mean and standard deviation of the attained intelligence quotients for each group (male, female, Negro, white, Negro male, white male, Negro female, white female, and total) were computed. Formulas 3.5 and 3.6 were used in this analysis.

$$\bar{X} = \frac{\Sigma X}{n} \qquad (3.5)$$

$$S = \sqrt{\frac{\Sigma x^2}{n - 1}} \qquad (3.6)$$

$$\text{where:} \quad \Sigma x^2 = \Sigma X^2 - \frac{(\Sigma X)^2}{n}$$

An F ratio was computed for each possible group comparison (M:F, W:N, WM:NM, WF:NF, WM:WF, NF:NM, WM:NF, and WF:NM) to evaluate whether the variances of the two population groups differed. This was tested by means of an F test which is defined as follows (Downie & Heath, 1965).

$$F = \frac{S_1^2}{S_2^2} \qquad (3.7)$$

where: $S_1^2$ = the larger of the two sample variances.

$S_2^2$ = the smaller of the two sample variances.

Following these computations, the standard error of the difference was calculated. If $S_1^2$ and $S_2^2$ were found to differ significantly (F value larger than the 10 percent ratio on a 2 tail test) and if $n_1$ was not equal to $n_2$, the standard error of the difference was found using formula 3.8 (Edwards, 1963).

$$S_{\bar{X}_1 - \bar{X}_2} = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}} \qquad (3.8)$$

If $S_1^2$ and $S_2^2$ did not differ significantly by the *F* test (*F* value smaller than the 10 percent ratio on a 2 tail test) the standard error of the difference was calculated using formula 3.9 (Edwards, 1963).

$$S_{\bar{X}_1 - \bar{X}_2} = \sqrt{\left(\frac{\Sigma x_1^2 + \Sigma x_2^2}{n_1 + n_2 - 2}\right)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)} \qquad (3.9)$$

A Fisher's *t* for testing the difference between uncorrelated means was then applied (Downie & Heath, 1965).

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S_{\bar{X}_1 - \bar{X}_2}} \qquad (3.10)$$

The results of this analysis are presented in tabular form for discussion in a succeeding chapter.

Summarized in Appendices A through I are the comparative performance made by Caucasian vs. Negro and male vs. female on each item of the six instruments. Tables have been drafted which show the performance of each group on individual items along with a chi square analysis of the comparative performances of the groups. An investigation of these results along with inspection of the sex by race computer printouts indicated which items should be examined further for possible sex-by-race variability. On the basis of this survey a number of additional chi square statistical tests were undertaken. Of these, only those which were found to be statistically significant are tabled in Appendix J.

# CHAPTER IV

## RESULTS OF THE INVESTIGATION

Six instruments were employed in an investigation which was designed to study various characteristics of disadvantaged preschool children. Three data gathering instruments (Behavior Inventory, Preschool Inventory, and Psychological Screening Procedure) were provided by the Office of Economic Opportunity for use in this and similar nation-wide programs. The others (Developmental Charts, Perceptual Drawings, and Stanford-Binet) were introduced by the writer, specifically for use in this research. Data were gathered in an Operation Head Start Program in Portland, Oregon, during summer 1965.

The Developmental Charts, Perceptual Drawings, and Psychological Screening Procedure were administered to all children in the program. The remaining three instruments were administered to a random sample of approximately one-third of the three hundred sixty-eight children enrolled.

A chi square analysis was undertaken with each item contained in the six instruments. Statistical comparisons were performed with all possible groups: Caucasian vs. Negro, male vs. female, and the six discrete comparisons, sex by race.

Chapter four will direct attention to the findings of the research. A discussion of the results will take place in the succeeding chapter. The results of various group performance on each of the six instruments will be presented independently. For each instrument the findings relative to male and female will be discussed first, followed by a presentation of the performance by Caucasian and Negro. Data available concerning the sex-by-race analysis will be introduced where applicable. Only performance variability which reached significance at the .05 or 01 level will receive attention in this presentation of the findings. References in the chapter will direct the readers attention to the complete instrument analysis which is in Appendices A through I. As a convenience to the reader, however, tables which summarize the significant findings relative to each instrument, are located throughout the chapter.

### Behavior Inventory

Findings relative to group performance on the Behavior Inventory are summarized in Appendix A. Table 12 presents the comparative performance by sex. There were no significant differences when the behavior of males were compared with females on the fifty items. There were, however, some combinations of attributes which were characteristic of one group or the other. Females were inclined to be more jealous, keep aloof, become upset and discouraged, need to be urged, exert minimum effort, be reluctant to use their imagination, and display more lethargic behavior than males. Boys tended to be more carefree, happy, and demonstrate imaginativeness while maintaining personal rights and displaying little respect for the rights of others.

Table 13 shows the results of the comparative performance by race on the same dimensions. Again, none of the comparisons reached statistical significance. In general, the Negro tended to be characterized more often as suggestible, habitual, quarrelsome, and emotional than were the Caucasian children.

The sex-by-race analysis yielded only one significant relationship, at the .05 level. More female Negro were evaluated as being either very

Table 3

Summary of Examination Items from the Behavior Inventory which are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | Sex by Race | |
| FN > MW | Is lethargic or apathetic; has little energy or drive | .05 |

much or somewhat lethargic or apathetic and possessing little energy or desire than were the male white.

Preschool Inventory

Appendix B contains a sample copy of the instrument and scoring standards, as well as the tables summarizing the performance by various groups. A chi square analysis by sex of independent items contained in the Preschool Inventory yielded only four statistically significant relationships (Table 14). Males were more adept (.05 level) in verbalizing the name of the first car of a train, while the females identified the "elbow" more often by name (.01), identified the color purple with greater consistency (.05), and more often associated the color orange with the vegetable carrot (.05).

There was greater variability in performance by race on this instrument than there was by sex. Table 15 shows that Negro children as a group more often identified the school by name which they would be attending in the fall (.01), were better at naming four or more objects at random in a period of ten seconds (.05), and more able to give their last name when requested to do so by the examiner (.05). At the .05 level of significance, the Caucasian children were more adept in identifying the colors red, blue, and purple. They could also more often identify the time of day associated with breakfast and give a supportive response when asked about the responsibilities of a doctor.

Appendix J consists of a series of tables which contain within them those items on the Preschool Inventory which were found to be significant in the sex-by-race analysis. The male white, at the .05 level, more often identified by name the first car of a train than did either the female Negro or female white. They also were able to identify the

### Table 4

### Summary of Examination Items from the Preschool Inventory which are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | **Male vs. Female** | |
| M > F | First car of train | .05 |
| F > M | What is this? elbow | .01 |
| | What color is this? purple | .05 |
| | What color is a carrot? | .05 |
| | **Caucasian vs. Negro** | |
| C > N | Last names given (none) | .05 |
| | What color is this? red | .05 |
| | blue | .05 |
| | purple | .05 |
| | When do we eat breakfast? | .05 |
| | What does a doctor do? | .05 |
| N > C | What school will you go to? | .01 |
| | Name all the things you can think of (4+). | .05 |
| | **Sex by Race** | |
| MW > MN | What pulls the train - the engine or the caboose? | .01 |
| MW > FW | How many wheels does a wheelbarrow have? | .05 |
| | What do we call the first car on a freight train? | .05 |
| MW > FN | What do we call the first car on a train? | .05 |
| FW > MW | Drawing of a square | .01 |
| FW > MN | What is this? elbow | .01 |
| | What color is this? purple | .05 |
| | brown | .05 |
| | Printed letters | .05 |
| | Drawing of square | .01 |
| | Drawing of triangle | .01 |
| MN > MW | What school do you go to? | .01 |
| | What day is today | .05 |
| FN > MW | What school do you go to? | .05 |

number of wheels which a wheelbarrow has more often than could the female white (.05) and made the correct choice more often than did the male Negro between the alternatives engine or caboose when asked what pulls a train (.01 level).

The male Negro performed better than the male white on two items: correctly identifying the day of the week (.05) and identifying the school which they would be attending (.01). The female Negro also performed significantly better than the male white on the latter item (.05).

The female white was better than the male white, at the .01 level of significance, in drawing a square. They were more adept than the male Negro on six items, the first three at the .01 level: identifying by name "elbow," drawing a square, drawing a triangle, printing letters, and identifying the colors purple and brown.

## Psychological Screening Procedure

In Table 16 (Appendix C) is summarized the comparative performance by male and female on the Psychological Screening Procedure. Chi square computations were not performed for those items with small frequencies. Findings showed that more females were thumb-sucking than were males (.05). Girls were also evaluated more often as being unhappy, failing to enjoy themselves or the things going on around them (.01). Results significant at the .05 level indicated males to have more difficulty than females in remaining seated and as being more hyperactive. In addition, boys were more inclined to disturb the activities and play of other children (.01) and were more provocative, deliberately interfering with most all group activity (.05).

When the behaviors of the children were analyzed by race (Table 17), three characteristics emerged, all significant at the .05 level. There

Table 5

Summary of Examination Items from the Psychological Screening Procedure which Are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | **Male vs. Female** | |
| M > F | Unable to remain seated | .05 |
| | The disruptive child | .01 |
| | The provocative child | .05 |
| | The hyperactive child | .05 |
| F > M | Constant thumb sucking | .05 |
| | The unhappy child | .01 |
| | **Caucasian vs. Negro** | |
| C > N | Stutters or stammers | .05 |
| | Interested in only 1 or 2 objects | .05 |
| N > C | Inability to interact with strangers | .05 |
| | **Sex by Race** | |
| MW > FW | Unable to remain seated | .05 |
| | The provocative child | .01 |
| | The disruptive child | .01 |
| MW > FN | Stutters or stammers | .05 |
| FW > MW | The unhappy child | .05 |
| FW > MN | The unhappy child | .05 |
| MN > FW | Unable to remain seated | .05 |
| | The provocative child | .01 |
| | The disruptive child | .01 |
| FN > MW | Inability to interact with strangers | .05 |
| FN > FW | The disruptive child | .05 |

was more stuttering and stammering among the Caucasian children and they more often restricted their interest to one or two objects than did Negro boys and girls. Negro children experienced an inability to interact with strangers.

The sex-by-race analysis (Appendix J) demonstrated that it was an appropriate behavior pattern by the female white which contributed to making the previously mentioned sex variables significant. Both the male white and male Negro were appraised as being more provocative (.01), disruptive (.01), and unable to remain seated (.05) than were the female white. In addition, the female Negro was evaluated as being a more disruptive child than was the female white (.05 level). On the other hand, this analysis showed that only the female white was appraised as an unhappy child when compared with the male Negro and male white (.05).

It was also found that the male white had a higher incidence of stuttering than did the female Negro (.05), while the female Negro experienced more difficulty than the male white in ability to interact with strangers (.05).

Mental Developmental Chart

A summary of the male vs. female analysis (Appendix D, Table 18) showed that the female preschool children performed better than the male children in three areas (naming colors, showing colors, and naming of animals), all at the .01 level of significance. As a group, performance by the males did not significantly surpass the females in any area. In general, the females did better on the remaining items comprising this instrument, even though many differences did not approach significance.

An inspection of the sex-by-race analysis (Appendix J) shows that the female white performed significantly better (.01 level) than both the male white and male Negro on the same three dimensions (naming colors, showing colors, and naming of animals). In addition, the female white was better than the male white at singing a song from memory, naming three fruit, and arranging pictures in sequence, all at the .05 level of significance. They also did better (.05 level) than the male Negro on three additional items; saying nursery rhymes, rote counting of four objects, and arranging pictures in sequence.

The female Negro performed better than the male white (.05) and male Negro (.01) on one item, naming colors. The comparative performance by these discrete groups failed to reach significance on the other two items which were significant when sex was the only criterion for group formulation.

The female white also outperformed the female Negro (.05 level) on two items contained in the Mental Developmental Chart, arranging pictures in sequence and naming three animals.

The summary of the race analysis (Appendix D, Table 19) illustrates the uniformity of performance when the Caucasian children are compared with Negro children in the area of mental development. An analysis of the three hundred twenty-nine disadvantaged preschool children who were evaluated on this instrument yielded only one area in which performance variability reached significance, in naming three animals (.05). On this item the white children as a group did significantly better than the Negro children. It should be evident that this difference was due to the appropriate performance of the female white in particular, since it was previously indicated that this group performed significantly better than all three remaining sex-by-race groups (male white, female Negro, and male Negro) on this particular item.

## Table 6

Summary of Examination Items from the
Mental Developmental Chart which
Are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | **Male vs. Female** | |
| F > M | Names colors | .01 |
| | Shows colors | .01 |
| | 3 animals | .01 |
| | **Caucasian vs. Negro** | |
| C > N | 3 animals | .05 |
| | **Sex by Race** | |
| FW > MW | Singing song from memory | .05 |
| | Names colors | .01 |
| | Shows colors | .01 |
| | 3 animals | .01 |
| | 3 fruit | .05 |
| | Arranging pictures in sequence | .05 |
| FW > MN | Saying nursery rhyme | .05 |
| | Counts 4 objects | .05 |
| | Names colors | .01 |
| | Shows colors | .01 |
| | 3 animals | .01 |
| | Arranging pictures in sequence | .05 |
| FW > FN | 3 animals | .05 |
| | Arranging pictures in sequence | .05 |
| FN > MW | Names colors | .05 |
| FN > MN | Names colors | .01 |

Perceptual Developmental Chart

A review of the summary of male-female performance (Appendix E, Table 20) indicates that few differences existed between the sexes on this dimension. The male group did better than the females in two areas, both associated with visual perception. They responded more often to the foreground when presented a picture and were able to verbalize similarities among the visual stimuli with greater skill than were the girls (.05 level).

Inspection of the data when analyzed by race (Appendix E, Table 21) demonstrates superiority to the Negro youth in almost all areas of perceptual response. Their performance record was significantly better at the .01 level on seven items: identification of a bell from an auditory stimuli, identifying a pencil from touch, identifying a lemon from taste, recognizing from taste that a soda and graham cracker are dissimilar, identifying the smell of soap, and recognition of differences or similarities in apple-apple and in apple-orange through smell. They recognized an auditory sound as that of a hand clap more easily and more often identified by taste the similarity of two soda crackers at the .05 level.

The sex-by-race analysis (Appendix J) provides further evidence that the advantage of performance on this instrument was Negro. The male Negro performed significantly better than the male white on: bell (.01), lemon (.05), soda-soda (.05), soda-graham (.01), and apple-apple (.05). Their performance was better than the female white on eight of the twenty test items: similarities (.05), differences (.05), bell (.01), lemon (.05), soda-soda (.01), soda-graham (.05), soap (.01), and apple-apple (.01).

### Table 7

### Summary of Examination Items from the Perceptual Developmental Chart which Are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | **Male vs. Female** | |
| M > F | Foreground | .05 |
| | Similarities | .05 |
| | **Caucasian vs. Negro** | |
| N > C | Bell | .01 |
| | Hand clap | .05 |
| | Pencil | .01 |
| | Lemon | .01 |
| | Soda-soda | .05 |
| | Soda-graham | .01 |
| | Soap | .01 |
| | Apple-apple | .01 |
| | Apple-orange | .01 |
| | **Sex by Race** | |
| MN > MW | Bell | .01 |
| | Lemon | .05 |
| | Soda-soda | .05 |
| | Soda-graham | .01 |
| | Apple-apple | .05 |
| MN > FW | Similarities | .05 |
| | Differences | .05 |
| | Bell | .01 |
| | Lemon | .05 |
| | Soda-soda | .01 |
| | Soda-graham | .05 |
| | Soap | .01 |
| | Apple-apple | .01 |
| FN > FW | Bell | .01 |
| | Pencil | .05 |
| | Soda-graham | .05 |
| | Soap | .01 |
| | Apple-apple | .05 |
| FN > MW | Bell | .05 |
| | Pencil | .05 |
| | Soda-graham | .05 |
| | Soap | .01 |
| | Paste | .05 |
| | Apple-orange | .01 |

The performance of the female Negro was significantly better than the male white in six areas: bell (.05), pencil (.05), soda-graham (.05), soap (.01), paste (.05), and apple-orange (.01); and better than the female white in five areas: bell (.01), pencil (.05), soda-graham (.05), soap (.01), and apple-apple (.05). There were no significant differences within the race groups.

### Physical Developmental Chart

The performance by male-female on the Physical Developmental Chart (Appendix F, Table 22) was significantly different on three of the fifteen items, all favoring the girls: hopping on one foot (.05), carrying liquid (.01), and cutting with scissors (.01).

An analysis by race (Appendix F, Table 23) yielded results similar to those obtained from the perceptual chart analysis, namely a superiority to the Negro disadvantaged preschool child on the behaviors investigated. With exception of items related to performance on the walking board and cutting with scissors, all performance interpretations favored the Negro. Of these, seven were significant at the .01 level. These were climbing on the jungle gym, hopping on one foot ten times, successfully performing a forward somersault, clapping hands to the rhythm of music, simulating a push-pull activity, marching to the rhythm of music, and catching a ball bounced from a distance of five feet.

The sex-by-race analysis, tabled in Appendix J, shows that the variability in performance was equally as pronounced in favor of the Negro when discrete groups by sex and race were compared. The male Negro performed better than the male white at the .01 level of significance on five items: jungle gym, hopping on one foot, performing a somersault, clapping to rhythm, and simulating a push-pull activity.

Table 8

Summary of Examination Items from the Physical Developmental Chart which Are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | **Male vs. Female** | |
| F > M | Hops on one foot | .05 |
| | Carries liquid | .01 |
| | Cuts with scissors | .01 |
| | **Caucasian vs. Negro** | |
| N > C | Jungle gym | .01 |
| | Hops on one foot | .01 |
| | Somersault | .01 |
| | Claps to rhythm | .01 |
| | Push-pull activity | .01 |
| | Marches to rhythm | .01 |
| | Catches bounced ball | .01 |
| | **Sex by Race** | |
| FW > MW | Push-pull activity | .05 |
| | Carries liquid | .01 |
| | Cuts with scissors | .01 |
| FW > MN | Cuts with scissors | .01 |
| MN > MW | Jungle gym | .01 |
| | Hops on one foot | .01 |
| | Somersault | .01 |
| | Claps to rhythm | .01 |
| | Push-pull activity | .01 |
| | Marches to rhythm | .05 |
| | Catches bounced ball | .05 |
| MN > FW | Jungle gym | .01 |
| | Stomach roll | .05 |
| | Somersault | .01 |
| | Claps to rhythm | .05 |
| | Catches bounced ball | .05 |
| FN > MW | Hops on one foot | .01 |
| | Somersault | .05 |
| | Claps to rhythm | .01 |
| | Push-pull activity | .01 |
| | Marches to rhythm | .01 |
| | Carries liquid | .01 |
| FN > FW | Somersault | .05 |
| | Marches to rhythm | .05 |

In addition, they performed more appropriately in marching to rhythm and catching a bounced ball at the .05 level of significance. The male Negro performed better than the female white on five items: jungle gym (.01), stomach roll (.05), somersault (.01), clapping to rhythm (.05), and catching a bounced ball (.05).

Performance by the female Negro similarly dominated the male white: hopping on one foot (.01), performing a forward somersault (.05), clapping to rhythm (.01), simulating a push-pull activity (.01), marching to rhythm (.01), and carrying liquid (.01). They out performed the female white at the .05 level on two activities: performing a somersault and marching to rhythm.

There was some within group variability which only became apparent as the result of the sex-by-race analysis. The female white performed more appropriately than the male white on simulating a push-pull activity (.05) and carrying liquids (.01); and more adequately than either the male white or male Negro in cutting with scissors (.01).

## Social Developmental Chart

The results of the comparative performance by the various groups in the area of social development are reproduced in Appendix G. In Table 24 is summarized the comparative performance by male and female. The females were evaluated over the males by the teachers in willingness to take turns, striving to please adults, avoiding reckless play, and controlling anger—all at the .01 level of significance. The males were appraised as being more independent in the selection of toys and activities than were the females (.05 level).

Table 25 shows the comparative performance by race on the same dimensions, with only two items reaching statistical significance—

both at the .05 level. Negro children were evaluated as being less demanding of adult attention, while Caucasian children were appraised as more actively striving to increase their circle of peer associations. There was considerable uniformity in performance by these two groups on the remaining items which comprised the Social Developmental Chart.

The sex-by-race analysis on this instrument pointed out at least two interesting relationships. In effect, it was the male white who contributed most heavily to making the previously indicated sex differences significant. The female white performed better than the male white on four dimensions, all significant at the .01 level; taking turns, pleasing adults, hazard concept, and controlling anger. Similarly, the female Negro were appraised as displaying more appropriate behavior on four variables, three of which are identical to those significant in the female white-male white comparison: adult attention (.01), pleasing adults (.05), hazard concept (.05), and controlling anger (.05). On no dimensions did these two discrete female groups perform significantly better than the male Negro.

The second relationship concerned the comparative performance of the female Negro when compared with the three other discrete sex-by-race groups. All three groups (male white, female white, and male Negro) when compared with the female Negro, showed a tendency at the .01 level to seek to increase peer associations. In addition, the male Negro and male white were appraised at the .05 level of significance as being more able to independently select toys and activities than the female Negro.

Table 9

Summary of Examination Items from the
Social Developmental Chart which
Are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | **Male vs. Female** | |
| M > F | Selects activities | .05 |
| F > M | Takes turns | .01 |
| | Pleases adults | .01 |
| | Hazard concept | .01 |
| | Controls anger | .01 |
| | **Caucasian vs. Negro** | |
| C > N | Increases contacts | .05 |
| | Adult attention | .05 |
| | **Sex by Race** | |
| MW > FN | Selects activity | .05 |
| | Increases contacts | .01 |
| FW > MW | Takes turns | .01 |
| | Pleases adults | .01 |
| | Hazard concept | .01 |
| | Controls anger | .01 |
| FW > FN | Increases contacts | .01 |
| MN > FN | Selects activities | .05 |
| | Increases contacts | .01 |
| FN > MW | Adult attention | .01 |
| | Pleases adults | .05 |
| | Hazard concept | .05 |
| | Controls anger | .05 |

## Perceptual Drawings

This instrument was the only one of the six used in the research which required other than a 2 x 2 chi square analysis. Scoring of the youngsters approach to the perceptual task often introduced multiple variables, eliminating the pass-fail dichotomy. A summary of the analysis of these drawings is contained in Appendix H.

Table 26 of Appendix H shows the performance by male and female on this examination. The females more often used an appropriate pencil grasp and were more proficient in drawing the square, both at the .05 level of significance. In performing the operation of drawing the cross from a visual stimuli, they more often drew the vertical line with a downward stroke than did the males (.01).

In printing numbers there was a significant difference (.05) in the location where males and females placed them upon the paper. One half of the females who were able to print a letter upon a verbal request placed them at the top left of the paper, with the second most popular position being the middle left of the paper. In contrast, the males tended to place their numbers in either the middle left or middle right of the paper.

It is evident by an inspection of Table 27, that three significant differences emerged when the data were analyzed by race. More Caucasian than Negro children (.05) were adept in drawing the triangle from a visual stimuli.

There was a significant difference, at the .01 level, in the approach which the two groups used when drawing the cross. Caucasian children tended to prefer to draw the vertical line prior to the horizontal (seventy-nine percent), with a vertical-horizontal-horizontal

Table 10

Summary of Examination Items from the Perceptual Drawings which are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
| | **Male vs. Female** | |
| F > M | Appropriate pencil grasp | .05 |
| | Placement on paper of printed numbers | .05 |
| | Vertical line (↓) (cross drawing) | .01 |
| | Square drawing | .05 |
| | **Caucasian vs. Negro** | |
| C > N | Triangle drawing | .05 |
| | Order of drawing (cross drawing) | .01 |
| | Number of lines (square drawing) | .01 |

approach preferred by about twelve percent. The approach taken by Negro children was distributed primarily among three alternatives: sixty-eight percent vertical-horizontal, eighteen percent horizontal-vertical, and eleven percent vertical-horizontal-horizontal.

The variability in number of lines which the two groups used in drawing a square was also significant at the .01 level. Many more white children (seventy-one percent) drew the square using four distinct strokes than did the Negro children (forty-eight percent).

### Stanford-Binet, Form L-M

The results of the chi square analysis which was performed for each item on the Stanford-Binet, Year III-6 through Year X, are in Tables 28 and 29 in Appendix I. A chi square was not computed for those items at the higher and lower ages due to the rather uniform pass or failure on these items.

Table 28 shows that there was acutally little significant variability in the performance by male and female. The females performed better on two items: Comprehension III at the year IV-6 level (.01) and on number concepts at the VI year level (.05).

In Table 29 is summarized the performance by the two race groups. Data analyzed by race yielded no significant difference in performance on the Stanford-Binet.

The sex-by-race analysis of the Stanford-Binet items revealed four significant differences. At the .05 level of significance, both the female and male white performed better than the female Negro on an item at the five year level, Patience: Rectangles. The other two differences found the female Negro to perform better on an item at the

Table 11

Summary of Examination Items from the Stanford-Binet, Form L-M which are Significant at the .05 or .01 level

| Relationship | Examination Item | Significance Level |
|---|---|---|
|  | Male vs. Female |  |
| F > M | Comprehension III | .01 |
|  | Number concepts | .05 |
|  | Sex by Race |  |
| MW > FN | Patience: Rectangles, Year V | .05 |
| FW > MW | Comprehension III, Year IV-6 | .01 |
| FW > FN | Patience: Rectangles, Year V | .05 |
| FN > FW | Picture completion: Man, Year V | .05 |

five year level, Picture Completion: Man (.05) and the female white better than the male white on Comprehension III, at Year IV-6 (.01).

The mean IQ for the ninety-seven children evaluated on the Stanford-Binet was 97.14 (Table 30). The range of mean intelligence scores on this instrument went from a low of 92.52 for the male Negro to a high of 102.14 for the twenty-nine female white. Standard deviation scores for discrete groups varied from 10.24 to 16.83 IQ points.

A summary of the t-test comparisons between group means is presented in Table 31. Homogeneity of variance was tested by using the F test. This test revealed heterogeneity of variance for three group comparisons: white vs. Negro, male white vs. male Negro, and female white vs. male Negro. The t-test indicated two significant mean IQ differences. The means computed for the male and female groups were significant at the .05 level, while the mean comparisons for the female white and male Negro was significant at the .01 level.

## Summary

A relatively small number of significant differences were obtained in relationship to the number of observations and evaluations undertaken. The material available on these children is exhaustive, to the extent of overwhelming if not confusing the reader. The vague and belated manner in which the evaluation materials were introduced from the Office of Economic Opportunity is partially responsible for redundant behavior sampling in certain areas. The data which are available as the result of this item analysis, however, are invaluable as a foundation from which more valid and reliable instrumentation can materialize for subsequent research.

# CHAPTER V

# DISCUSSION, SUMMARY, AND CONCLUSIONS

Seldom is an issue in education or psychology resolved as the result of one individual's effort. More often parallel and independent studies, each extending the work of the other, combine to resolve the query. A natural consequence and vital essential of research is the inspection of personal results in light of former effort to investigate the question under consideration. Through such effort will eventually emerge the sanction to speak with assurance regarding the phenomena being investigated.

A comprehensive study of the characteristic behavior of disadvantaged preschool children is not an easy task. There are circumstances inherent in the design of research relating to this issue which make it difficult to generalize results. Attempts to delineate the sample under study is often complex. Validity and reliability of measuring instruments used with preschool children are frequently open to question. Geographical and situational influences upon the developmental behavior of children is not clear. These are but a few of the variables with which a researcher must wrestle if comparability and some degree of universal applicability is desired.

Attention will be directed in this chapter toward a discussion and comparison of the findings with the review of literature introduced in a preceeding chapter. The results obtained from each instrument will be discussed independently with regard to support or denial of existing evidence. Emerging from this will be a summary discussion relating the findings to the hypothesis which was extended prior to investigation. A listing of the most significant findings will conclude the presentation of this research study.

## Behavior Inventory

There was little variability in performance between any group on the fifty behavioral characteristics comprising this instrument. The lone significant variable concerned the female Negro and male white, with the former evaluated by teachers and aids as being lethargic or apathetic more often than the latter.

The extent to which these examination items represent personality variables is not known. It is suspected, however, that they represent attributes which may be associated with specific personality types. The absence of any clear group trend supports the position taken by Tyler (1956), who acknowledges the possibility of characteristic personality differences between Negroes and whites in our society, but finds little satisfactory evidence to support it.

Research by Clausen and Williams (1963) and Grossak (1965) demonstrated that preschool Negro children are no more aggressive or disturbing as a group than any other. They recognized, however, that between ages five and eight defense reactions, negative self-feelings, and group conflict occur. It has been speculated that it is the increasing awareness of his social devaluation which promotes the change in behavior pattern (Radke & Trager, 1950).

Disadvantaged children have been found to have difficulty in accepting personal responsibility (Ausubel & Ausubel, 1963; Goff, 1954) and to have low self-concept (Keller, 1963). The extent to which this group of disadvantaged children differs from more advantaged children is unknown, although it seems clear that there is little or no variability between these groups of disadvantaged children.

Teachers often speak of the same pattern. Upon entering school the disadvantaged child is open, warm, and accepting; while following three or four years of school they (particularly boys) become increasingly rebellious and more difficult to manage. Curriculum specialists and psychologists should examine carefully the nature of the child's experiences during these early school years. Some suspect that the progressive retardation of behavior pattern is developmental. The evidence may more readily support that it is inherent in the educational program and experiences which are available to the child during the early school years.

## Preschool Inventory

As the reader will recall, the Preschool Inventory investigated a large number of behavioral areas. It was intended to show the teacher which concepts a child possessed and in which he was deficient. The relationship between one set of items and another is not clear to the writer, thereby making it difficult to associate significance to varying performance levels. The high percentage of correct response by the sample on several items during the pretest raises some question regarding the appropriateness of the instrument.

None of the significant differences identified by sex or race were universally confirmed when the data were examined sex-by-race. While the females tended to be more advanced in color identification, it was determined upon further inspection that this was only substantiated when comparing the female white with the male Negro. The Caucasian mastery on the same dimension was also the result of the female white superiority. No evidence was sound in the review of the literature to support or deny the skill of the female white preschool child in knowledge of color.

The female white was more proficient than either male group on certain perceptual drawing exercises. This contrast in performance was more pronounced when comparing the performance of the female white with the male Negro. There is considerable agreement that perceptual functioning is related to stimulation in the environment and the extent of manipulative and interactive experience (Bloom, Davis, & Hess, 1965; Havighurst, 1964). In addition, several believe that the keenness of the senses between the various races of mankind are about equal (Jenkins & Paterson, 1961) and that if differences exist, they are due to training of sensory powers (Havighurst, 1964; Klineberg, 1935). No discussion was found relating sex variability to sensory functioning. Similarly, there was no reason to suspect an enhanced environmental exposure for the female white to account for the better performance.

Several other sex-by-race differences cannot be compared in the absence of known research attending to similar variables. The male white did better than any other group on an information item pertaining to trains. Both Negro groups identified the name of their future school more often than did the male white.

Evidence gained from the Preschool Inventory would tend to indicate that concept formation and general environmental awareness is not exclusively an attribute of one discrete group of disadvantaged children over another. An investigation with more advantaged children, however, might show that a comparative absence of knowledge in conceptual areas does exist between groups of advantaged and disadvantaged children.

## Psychological Screening Procedure

A rapid or casual inspection of the table summarizing the chi square analysis (Table 5) of the Psychological Screening Procedure could result in misleading impressions. While the results indicate that the males as a group displayed less appropriate behavior patterns than the females, the sex-by-race analysis indicates clearly that the variability was only between the female white and the two male groups. These results are consistent with the findings of several research studies of young children which found more violent and disrupting behavior among preschool boys than girls (Dawe, 1934; Jersild & Markey, 1935; Sanford, 1943; Siegel, 1956). The specific parallel with the findings reported herein is now clear, however, since studies have seldom concerned themselves with disadvantaged preschoolers or progressed beyond the male-female analysis to examine intergroup variability.

The sex-by-race analysis indicates that it was the female whites and not the female Negro group which contributed to making the male-female "unhappy child" item significant. There is no evidence in the existing literature that would suggest that this trait is characteristic of the disadvantaged female white preschool child.

There was more thumb sucking among the female group than among the males. In clinical settings this behavior is often associated with dependency. The extent to which this is a valid association is open to question. Nevertheless, girls tend to have overdependence as a symptom more often than boys (Beller & Neubauer, 1958), be more dependent upon their teacher (Hattwick, 1937; Marshall & McCandless, 1957), and be more often characterized by succorant and nurturant behavior (Sanford, 1943).

Caucasians were evaluated as displaying more stuttering and stammering speech than were Negroes. Upon further inspection, however, it was determined that this attribute was significant only when comparing the male white with the female Negro. While there is considerable evidence that girls display more appropriate speech and language patterns at an earlier age than do boys, and that the incidence of stuttering is generally greater among males (Gesell, 1940; Jersild & Ritzman, 1938; McCarthy, 1930; Templin, 1957), no research was located which specifically investigated the developmental speech patterns of disadvantaged preschool children.

The female Negro, when compared with the male white, tended to have difficulty in interacting with strangers. While dependency among girls often prevails, there is no evidence that the female Negro displays a more withdrawing behavior than any other group of females.

McCandless (1952) found disadvantaged children to be more concrete and flexible in their intellectual functioning. It is not clear whether the narrow range of interests which was more characteristic of the Caucasian than the Negro is related.

## Mental Developmental Chart

Items which comprised the Mental Developmental Chart were essentially those which are given attention in most readiness programs. Some which would be included are activities and exercises to promote the development of color discrimination, number awareness, classification and recognition of sets, memory and recall, and ordering of events in sequence.

The summary of significant item differences on this instrument (Table 6) shows the advantage in functional level in these areas to be entirely female. There were no dimensions upon which any male group performed better than the females. The sex-by-race analysis shows the developmental advantage which the female white group displayed.

The advantage to the girls on these dimensions tends to be consistent with previous findings relative to sex variability in performance. In standardizing the Stanford-Binet, McNemar (1942) found the girls to perform better on many independent tasks at the preschool level, particularly on memory and recall items, number relationships, and matching or ordering objects. Likewise, the female white children were found to be more proficient on similar tasks on this instrument. Buckingham and MacLatchy (1930) and Gesell (1940) have published similar supporting evidence for these findings. Williams (1964), however, found that when the factors of mental maturity and socioeconomic status were controlled that there were no significant differences in mathematical achievement means among preschool boys and girls. While the latter of these two variables appears to be controlled by the criteria which was prescribed for group selection, it is possible that the significant IQ mean differences between the male and female group contributed to the significance levels attained upon analysis of performance on the Mental Developmental Chart.

Both female groups were better than either male group on one item, naming colors. This may be associated in part to their verbosity and verbal fluency (Jersild & Ritzman, 1938; Young, 1941) advantage over the boys at this age level.

The female white performed more adequately than did the female Negro on two items, naming three animals and arranging pictures in sequence. There is no evidence known to the writer which would support or contradict these findings.

It should be evident to the reader that Caucasian-Negro variability did not exist on the dimensions investigated on this instrument. The one dimension which was found to be significant in the race analysis (naming three animals) was not significant for the male white group over either Negro group in the sex-by-race analysis.

### Perceptual Developmental Chart

Considerable emphasis was placed in the Head Start program upon the development of sensory perception in children (touch, hearing, smell, taste, and vision as avenues through which information can be acquired). The Perceptual Developmental Chart was created to examine the extent to which disadvantaged preschool children could utilize these avenues in ordering meaning from environmental stimuli prior to the educational effort to improve the media.

The advantage in performance on this instrument was clearly to the Negro. As a group, the Negro children performed significantly better on at least one task representing use of every sensory modality except visual acquity. Although their advantage did not reach significance they also performed more competently on three out of four tasks associated with visual stimuli. The sex-by-race analysis showed approximately equal dominance by both Negro groups over both Caucasian groups.

There is no evidence in the literature that even hints that proficiency in the use of sensory perception among disadvantaged preschool children would so predominantly favor the Negro. In fact, according to the social class of young children, Vera John (1965) found no studies demonstrating significant variations in sensory threshold. None of the studies which she reviewed, however, entertained the possibility of variability by race within a comparable social class community.

Writers have expressed the opinion that a child's perceptual development must begin early and take place through the sensory modalities of smell, vision, touch, taste, and hearing (Bloom, Davis, & Hess, 1965; Piaget, 1959) and that the height of development is dependent upon the individual's direct experience with environmental factors (Snygg & Combs, 1959; Havighurst, 1964; Gibson, 1963). Furthermore, the keenness of the senses are about on a par in the various races of mankind (Jenkins & Paterson, 1961) and observed differences depend upon the training of the powers of observation (Klineberg, 1928). Assuming these to be valid postulates, how are the differences in performance on this instrument explained?

The only explanation available within this framework is to examine the environmental experiences of these disadvantaged Caucasian and Negro preschool children. Neither, it seems, could be characterized as having had extensive variety in environmental manipulative and interactive experiences. Further research which examines the perceptual functioning of advantaged and disadvantaged children for between race variability, with specific attention given to cultural and environmental anticedents, is needed to adequately test the validity of theories postulated relating to sensory perceptual development in children.

## Physical Developmental Chart

The performance by the Negro children on this instrument was outstanding. As a group they performed significantly better than the white children on seven items, three of them activities involving rhythm. While there is evidence that disadvantaged children as a group might be expected to perform well on the items comprising this instrument, there is no known research which has investigated for variability in psycho-motor performance between races.

Riessman (1963) discussed attributes which he believed were specific strengths of the disadvantaged child. Among them were a physical style involved in learning and an enjoyment for music. While he does not substantiate his convictions with research, the findings of this study suggest why such children might value these styles, namely because of their facilty to perform well. In an earlier writing he characterized the style of the disadvantaged child as physical and visual rather than aural (Riessman, 1962).

Gesell (1940) identified two areas in which boys performed better than girls during the preschool years. They were more adequate in throwing activities and performing on a walking board. The variability in performance by sex did not reach significance on similar items contained in the Physical Developmental Chart. On the basis of this study, which involved disadvantaged children, his findings would not be supported. In fact, there was more homogeneity in performance by sex on the four examination items pertaining to these two variables than to any other.

The results of studies undertaken by Ilg and Ames (1965) at the Gesell Institute are not entirely consistent with the findings on this instrument. In general, their studies have shown that girls are superior and show greater maturity than boys on motor tasks at the preschool level. While their overall performance was better, it reached significance on only three of the tasks included in the instrument (hopping on one foot, carrying liquids, and cutting with scissors). Despite these differences, there was considerably more variability by race.

Motor skills which an individual acquires can determine the degree to which he will succeed in social, educational, and vocational areas (Crow & Crow, 1962). Heffernan and Todd (1964) have emphasized the importance of physical skills during the preschool years. The physical skill of Negro children can and should be an avenue through which the schools provide opportunity for positive self-reference and build feelings of self-confidence.

## Social Developmental Chart

The extent to which social behavior can facilitiate or interfere with learning is well known. Assuming that disadvantaged children may be somewhat less highly developed than middle class children in affective qualities, a purposeful plan of activities was introduced to enhance social attributes and behavior. This instrument evaluated the relative accomplishment of various groups prior to the instructional program.

Girls tend to be more interested in interpersonal relations and generally make higher ratings on sociometric measures than boys (Marshall & McCandless, 1957; Tuddenham, 1952; Winker, 1949). This was not the general pattern which was obtained upon analyzing the results of the Social Developmental Chart. While the analysis by sex showed the advantage to the female, the sex by race analysis demonstrated that the female performance was more appropriate only with respect to the male white. The male white tended to more aggressively seek the position of first and display unwillingness to take turns, participate in reckless play, loose self control upon becoming angry, and be less concerned about pleasing adults than were either female group.

Although she did not attempt to analyze behavior for possible race variability, Goodenough (1929) concluded from a study of 990 preschool children that lower class boys were least shy of all. This instrument tends to support the Goodenough findings since the dimensions which characterized the male white group on this evaluation do not appear to be associated with shyness.

Negro preschool children, as a group, have been evaluated as possessing relatively neutral attitudes, free from hostility, aggression, and disturbing behavior (Clausen & Williams, 1963; Grossak, 1965). This research supported this contention to the extent that the Negro youth are compared with children with similar backgrounds. Their comparative behavior with more advantaged children is not known.

The female Negroes were less inclined to increase their circle of peer associations or to independently select activities than either male group. No evidence was found in the literature which could extend significance to these findings. Evidence supporting the reliability of these findings, however, can be found internally in this study. The female Negro were found to be lethargic with little energy or drive and unable to interact with strangers on the Behavior Inventory and Psychological Screening Procedure respectively.

## Perceptual Drawings

The current thinking relative to the development of perceptual skills were presented earlier in the chapter when the findings concerning performance on the Perceptual Developmental Chart were discussed. Group performance on this instrument will be compared with the normative data available on the same dimensions studied at the Gesell Institute of Child Development (Ilg & Ames, 1965). It should be clear that a primary objective for introducing this instrument in the design was to study approaches to perceptual tasks. Discussion will be limited primarily to those items upon which group performance was found to vary significantly.

As would be expected, the overall performance by this group was considerably poorer in terms of normative approaches to perceptual tasks than the children studied by Ilg and Ames. This comparison will not be highlighted, however, due to the dissimilar study groups and absence of tabled normative data to correspond with the exact mean chronological age of children included in this study.

Almost seventy-nine percent of the females held a pencil with the customary pinch grasp, a performance advantage significant at the five percent level when compared with males (sixty-six percent). Comparative data are not available on this dimension in the Ilg and Ames studies.

Many more girls placed their numbers at the top of the paper than did boys. Still, many were placed by both groups either at the middle or bottom of the page. Ilg and Ames have found that at five years of age most children write numbers on the lower half of the paper.

Drawing of the vertical line on the cross was approached differently by females and males, with more of the former drawing it with a downward stroke. These findings are consistent with the studies conducted at the Gesell Institute, where more girls than boys drew the line from top to bottom.

Significantly fewer males received a passing evaluation on their square drawing than did the females. Appropriate response to this task is generally considered normative by age five (Terman & Merrill, 1960), although neither males or females comprising this sample performed that well.

Caucasian children reproduced the triangle drawing more accurately and approached the drawing of two other geometric figures more appropriately than did the Negro children. Their order of drawing lines on the cross and number of lines used in drawing the square both represented development at a higher comparative level. Approximately fourteen percent more whites drew the triangle in a manner to receive a positive evaluation. Studies reported of the work being done at the Gesell Institute have not analyzed data for possible race variation.

### Stanford-Binet, Form L-M

The item analysis of the Stanford-Binet, Form L-M, yielded only two differences which reached significance in the male-female comparison (both favoring the female) and none by race. McNemar (1942) found that girls tend to do better than boys on a number of independent tasks in the Stanford-Binet scale up until age five and one-half. This is likewise true of these findings, although few differences reached significance. No data were located which examined the performance of preschool children on the Binet for possible race differences.

The females performed significantly better than the males on Comprehension III at the IV-6 year level and on Number Concepts at the VI year level. An examination of the sex by race analysis (Table 11) shows that the superior performance on the first of these was actually only true of the female white when compared with the male white. The second, Number Concepts, was a general superior performance by the females over the males. These findings are not consistent with those of Williams (1964) who concluded that there were no significant differences in mathematical achievement means between boys and girls when the factors of mental maturity and socio-economic status were controlled. A direct comparison with the findings by Williams may not be appropriate since the extent to which performance on this Binet item correlates with mathematical achievement is not known, and the female group did obtain a significantly higher IQ rating on the Binet than did the boys.

The female Negro performed significantly better than the female Caucasian on Picture Completion: Man at the V year level. These findings are not entirely consistent with those found by Anastasi and D'Angelo (1952) and Gesell (1940). They concluded that girls, as a group, include more details than boys on both drawing a man and on the incomplete drawing test. As the reader will recall, receiving a passing evaluation on this item in the Binet scale is directly related to the details included in completing the incomplete drawing.

Patience: Rectangles, Year V, was a particularly difficult item for the female Negro. Their performance was significantly inferior to that of Caucasian children. While this item does tend to be rather difficult for the age group where it is included in the scale, there is no known existing evidence with which to compare this difference in performance.

Certain individuals have been preoccupied in an attempt to explain the frequently attained IQ differences between Negro and Caucasian children. Some are determined that the differences which are generally obtained are the result of inherent cultural differences (Feingold, 1924; Hirsch, 1926; Garrett, 1965; Shuey, 1958). There is no need to debate the issue relevant to this study since the mean IQ scores obtained by Caucasian (98.83) and Negro (94.83) are not statistically significant. The attained scores are particularly encouraging in view of the cultural bias of examinations which often cause children from deprived backgrounds to receive scores which are inaccurate reflections of basic intelligence (Eells, 1953). In addition, the Caucasian examiner may have contributed slightly to the lower scores received by the Negro children from what is known regarding examiner-client interaction (Canady, 1936; Pasamonick & Knobloch, 1955).

Shuey (1958) found the least difference in IQ's (ten points) between white and Negro children at the preschool level. This sample varied only four IQ points while at the same time attaining somewhat higher mean scores. The mean for all groups of children on this instrument was well within the normal range of ability. Although both female groups scored higher than either male group, it does not seem that the magnitude of difference is sufficient to account for variability between and within groups on other measures used in this study.

## Conclusions

As the reader undoubtedly recognizes, there is considerable data regarding disadvantaged preschool children within this study. In spite of this, conclusions are not easily generated. Factors which make this task a difficult one are: (1) the breakdown of many of the established sex and race differences when the data were analyzed sex-by-race, (2) the experimental stage of development of many of the data gathering instruments, (3) the absence of data regarding item relatedness within and between some instruments and (4) the absence of research dealing with sex and race differences on the dimensions investigated.

Nevertheless, some rather distinct group patterns of behavior were identified. Unless a significant finding could be generalized concerning race or sex it was not included in the listing of conclusions. The sex-by-race analysis was extremely valuable as a control against unwarranted sex or race conclusions. The reader should keep in mind that all differences pertain to disadvantaged preschool children.

## Sex Differences

(1) There are few generalized differences on behavior or psychological dimensions by sex.

  (a) Males are more hyperactive than females.
  (b) Females display more thumb sucking behavior than males.

(2) There is some difference in performance by sex in the area of concept development.

  (a) Females are more adept in naming colors than males.
  (b) Females are superior to males in number concept.

(3) Females display more appropriate social behavior than males.

(4) Females attained a higher mean IQ score, as measured on the Stanford-Binet, Form L-M, than the males.

## Race Differences

(1) There is little generalized difference on behavior or psychological dimensions by race.

  (a) Caucasian children are more often interested in only one or two objects or activities than the Negro children.

(2) Negro children are more skillful on tasks demanding physical coordinative ability than Caucasian children.

(3) Negro children are superior to Caucasian children in sensory perception.

A number of sex-by-race differences were highlighted throughout this study. Some related to performance on specific examination items, while others were based upon a broader and subjective appraisal by the examiner. Further evidence is needed before generalizations can be justified for a number of the differences resulting from performance on independent items. Several appraisals were made of the subjective variety concerning behavior or psychological dimensions. Some of these significant sex-by-race differences deserve mention.

(1) Female white children are less disruptive, less provocative, and better able to remain seated than either the male white or male Negro.

(2) There is less stuttering and stammering speech among female Negroes than among male whites.

(3) The male white and male Negro are both evaluated as more happy children than the female white.

(4) Female Negroes have more difficulty interacting with strangers than the male whites.

(5) Female Negroes are more disturbing and disruptive than the female whites.

(6) Female Negroes are more lethargic or apathetic and display less energy or drive than the male whites.

It was hypothesized that the performance of underprivileged preschool children with respect to characteristics classified as social, cognitive, perceptual, psychological, or developmental will vary more with sex than race, and more significantly in those characteristics or traits that are most exactly associated with academic education. There are actually two distinct attributes associated with the hypothesis as proposed. One is concerned with the established quantity of difference in performance by sex and race, the other with the quality or nature of these differences. Both would have to be in the predicted direction for the hypothesis to be retained as tenable.

Several distinct differences were found in the performance by males and females on the dimensions investigated. There was, however, also variability in the performance between the two race groups. While the overall behavior pattern in many areas favored the females, the sex-by-race analysis revealed that this advantage frequently could not be generalized as a characteristic attribute.

The quality of significant performance differences appeared to be in the predicted direction. Females were more advanced in social behavior and concept development, both of which are considered positive traits and most often associated with readiness programs in preparation for academic education.

On the basis of these findings it is necessary to reject the hypothesis. While the differences tended to be in the predicted direction, the range of variability was not present.

## Implications

A number of behaviors of preschool disadvantaged children were evaluated in this study. Due to lack of coordination time there was duplication in certain areas. Some instruments contributed very little toward extending knowledge regarding the disadvantaged. The dependence upon newly conceived instruments, in the absence of effective standardized measures, undoubtedly contributed to overlapping and in some instances unnecessary behavior sampling.

Evaluations were made in this study of many cognitive and affective behaviors of children. It must be recognized, however, that this represents a small effort in consideration of possible behavioral manifestations which need investigation. Continuing inquiry into the nature of differential development in early childhood is vitally necessary.

Cognitive behavior examined were primarily those dealing with knowledge and comprehension of information. There was little attempt to investigate higher intellectual processes which may require the youngster to apply, analyze, synthesize, or evaluate. In effect, the lower and earlier sequence of cognitive development were examined as opposed to higher order intellectual processes.

Affective attributes which were examined centered primarily around those dealing with adequate adjustment. A substantial body of information was gained relative to the behavioral and psychological functioning of disadvantaged children. These represent, however, only one phase of affective qualities about which information is needed. Interest patterns, attitudes, and values are important areas which contribute significantly to productive behavior. Appraisal of these less visible attributes will quite likely be possible only over longer periods of time.

Intensive study is needed of the speech and language patterns of disadvantaged children. There is likely a relationship between patterns of oral communication and internal organization of intellectual processes. Attention directed toward study and curricular planning to enhance communicative skills may prove to be one of the more fruitful and rewarding educational efforts.

Lack of instrumentation for use with disadvantaged populations should be of primary concern to researchers. Evidence gained as the result of this study indicated that observational records used by teachers can yield reliable information about the behavior of children. Validation emerges through parallel development of instruments with curricular planning. In addition, adequately constructed instruments can give direction to teachers by providing a standard toward which to teach. It seems reasonable to expect educators to independently examine individual programs rather than relying upon evaluative, descriptive, or narrative accounts of global efforts.

## Summary

The primary objective of this study was to identify developmental characteristics of disadvantaged preschool children. Several dimensions of child behavior were evaluated during a preschool Head Start Program. Performance was analyzed by using a chi square analysis for all race and sex combinations.

There were few generalized differences on behavior of psychological dimensions by sex or race. Females tended to display more appropriate social behavior and perform better in the area of concept formation. In addition, they received a higher mean IQ evaluation than males on the Stanford-Binet. Negro children were particularly skillful on physical-coordinative tasks and in sensory perception.

Some of the more striking and revealing aspects of this study concerned frequently suspected sex or race variability which never materialized. There was a distinct absence of significant overt behavior differences between the two race groups. Mean IQ scores for all groups fell within the normal range of ability, with no significant difference between the mean scores attained by Negro and Caucasian children. Differences in performance in the area of conceptual development was significant by sex but not by race.

This study is proving useful to curriculum personnel in designing future preschool programs. Data which are available allows them to prescribe programs commensurate with the needs of children. Subjective judgment, which has heretofore prevailed, is being examined.

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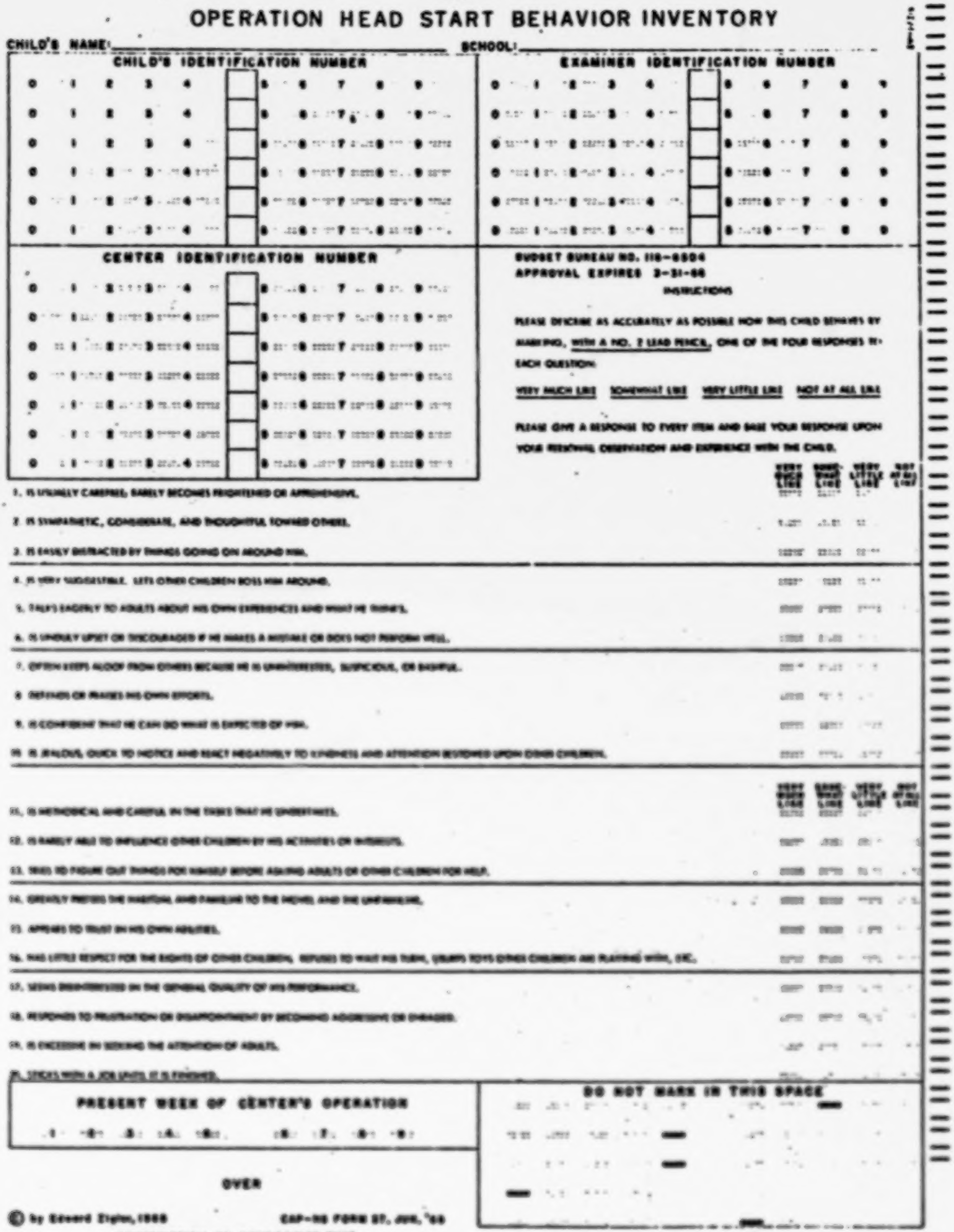
# APPENDIX

# Appendix A

## Behavior Inventory

Examination copy and chi square analysis
of performance by sex and race.

Figure 1



## OPERATION HEAD START BEHAVIOR INVENTORY

CHILD'S NAME: ______________________ SCHOOL: ______________________

**CHILD'S IDENTIFICATION NUMBER**

0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9

**EXAMINER IDENTIFICATION NUMBER**

0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9

**CENTER IDENTIFICATION NUMBER**

0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
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0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9

BUDGET BUREAU NO. 116-6504
APPROVAL EXPIRES 3-31-68

INSTRUCTIONS

PLEASE DESCRIBE AS ACCURATELY AS POSSIBLE HOW THIS CHILD BEHAVES BY MARKING, WITH A NO. 2 LEAD PENCIL, ONE OF THE FOUR RESPONSES TO EACH QUESTION:

VERY MUCH LIKE SOMEWHAT LIKE VERY LITTLE LIKE NOT AT ALL LIKE

PLEASE GIVE A RESPONSE TO EVERY ITEM AND BASE YOUR RESPONSE UPON YOUR PERSONAL OBSERVATION AND EXPERIENCE WITH THE CHILD.

| | VERY MUCH LIKE | SOME-WHAT LIKE | VERY LITTLE LIKE | NOT AT ALL LIKE |
|---|---|---|---|---|
| 1. IS USUALLY CAREFREE; RARELY BECOMES FRIGHTENED OR APPREHENSIVE. | | | | |
| 2. IS SYMPATHETIC, CONSIDERATE, AND THOUGHTFUL TOWARD OTHERS. | | | | |
| 3. IS EASILY DISTRACTED BY THINGS GOING ON AROUND HIM. | | | | |
| 4. IS VERY SUGGESTIBLE. LETS OTHER CHILDREN BOSS HIM AROUND. | | | | |
| 5. TALKS EAGERLY TO ADULTS ABOUT HIS OWN EXPERIENCES AND WHAT HE THINKS. | | | | |
| 6. IS UNDULY UPSET OR DISCOURAGED IF HE MAKES A MISTAKE OR DOES NOT PERFORM WELL. | | | | |
| 7. OFTEN KEEPS ALOOF FROM OTHERS BECAUSE HE IS UNINTERESTED, SUSPICIOUS, OR BASHFUL. | | | | |
| 8. DEFENDS OR PRAISES HIS OWN EFFORTS. | | | | |
| 9. IS CONFIDENT THAT HE CAN DO WHAT IS EXPECTED OF HIM. | | | | |
| 10. IS JEALOUS, QUICK TO NOTICE AND REACT NEGATIVELY TO KINDNESS AND ATTENTION BESTOWED UPON OTHER CHILDREN. | | | | |

| | VERY MUCH LIKE | SOME-WHAT LIKE | VERY LITTLE LIKE | NOT AT ALL LIKE |
|---|---|---|---|---|
| 11. IS METHODICAL AND CAREFUL IN THE TASKS THAT HE UNDERTAKES. | | | | |
| 12. IS RARELY ABLE TO INFLUENCE OTHER CHILDREN BY HIS ACTIVITIES OR INTERESTS. | | | | |
| 13. TRIES TO FIGURE OUT THINGS FOR HIMSELF BEFORE ASKING ADULTS OR OTHER CHILDREN FOR HELP. | | | | |
| 14. GREATLY PREFERS THE HABITUAL AND FAMILIAR TO THE NOVEL AND THE UNFAMILIAR. | | | | |
| 15. APPEARS TO TRUST IN HIS OWN ABILITIES. | | | | |
| 16. HAS LITTLE RESPECT FOR THE RIGHTS OF OTHER CHILDREN, REFUSES TO WAIT HIS TURN, USURPS TOYS OTHER CHILDREN ARE PLAYING WITH, ETC. | | | | |
| 17. SEEMS DISINTERESTED IN THE GENERAL QUALITY OF HIS PERFORMANCE. | | | | |
| 18. RESPONDS TO FRUSTRATION OR DISAPPOINTMENT BY BECOMING AGGRESSIVE OR ENRAGED. | | | | |
| 19. IS EXCESSIVE IN SEEKING THE ATTENTION OF ADULTS. | | | | |
| 20. STICKS WITH A JOB UNTIL IT IS FINISHED. | | | | |

**PRESENT WEEK OF CENTER'S OPERATION**

1 2 3 4 5 6 7 8 9

**DO NOT MARK IN THIS SPACE**

OVER

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# OPERATION HEAD START BEHAVIOR INVENTORY

| | VERY MUCH LIKE | SOME-WHAT LIKE | VERY LITTLE LIKE | NOT AT ALL LIKE |
|---|---|---|---|---|
| 21. GOES ABOUT HIS ACTIVITIES WITH A MINIMUM OF ASSISTANCE FROM OTHERS. | | | | |
| 22. IS CONSTRICTED, INHIBITED, OR TIMID; NEEDS TO BE URGED BEFORE ENGAGING IN ACTIVITIES. | | | | |
| 23. IS EVEN-TEMPERED, IMPERTURBABLE; IS RARELY ANNOYED OR CROSS. | | | | |
| 24. IS RELUCTANT TO TALK TO ADULTS; RESPONDS VERBALLY ONLY WHEN URGED. | | | | |
| 25. WORKS EARNESTLY AT HIS CLASSWORK OR PLAY; DOESN'T TAKE IT LIGHTLY. | | | | |
| 26. IS OFTEN QUARRELSOME WITH CLASSMATES FOR MINOR REASONS. | | | | |
| 27. DOES NOT NEED ATTENTION OR APPROVAL FROM ADULTS TO SUSTAIN HIM IN HIS WORK OR PLAY. | | | | |
| 28. WHEN FACED WITH A DIFFICULT TASK, HE EITHER DOES NOT ATTEMPT IT OR GIVES UP VERY QUICKLY. | | | | |
| 29. DOESN'T LIKE TO BE INTERRUPTED WHEN ENGAGED IN DEMANDING ACTIVITIES, E. G., PUZZLES, PAINTING, CONSTRUCTING THINGS. | | | | |
| 30. WELCOMES CHANGES AND NEW SITUATIONS; IS VENTURESOME, EXPLORES, AND GENERALLY ENJOYS NOVELTY. | | | | |

| | VERY MUCH LIKE | SOME-WHAT LIKE | VERY LITTLE LIKE | NOT AT ALL LIKE |
|---|---|---|---|---|
| 31. CALMLY SETTLES DIFFICULTIES THAT ARISE WITHOUT APPEAL TO ADULTS OR OTHERS. | | | | |
| 32. IS RELUCTANT TO USE IMAGINATION; TENDS NOT TO ENJOY "MAKE-BELIEVE" GAMES. | | | | |
| 33. LIKES TO TALK WITH OR SOCIALIZE WITH TEACHER. | | | | |
| 34. OFTEN WILL NOT ENGAGE IN ACTIVITIES UNLESS STRONGLY ENCOURAGED. | | | | |
| 35. IS EAGER TO INFORM OTHER CHILDREN OF THE EXPERIENCES HE HAS HAD. | | | | |
| 36. EMOTIONAL RESPONSE IS CUSTOMARILY VERY STRONG; OVER-RESPONDS TO USUAL CLASSROOM PROBLEMS, FRUSTRATIONS, AND DIFFICULTIES. | | | | |
| 37. IS UNCOOPERATIVE IN GROUP ACTIVITIES. | | | | |
| 38. IS USUALLY POLITE TO ADULTS; SAYS "PLEASE," "THANK YOU," ETC. | | | | |
| 39. ASKS MANY QUESTIONS FOR INFORMATION ABOUT THINGS, PERSONS, ETC. (EMPHASIS HERE SHOULD BE ON QUESTIONS PROMPTED BY GENUINE CURIOSITY RATHER THAN BIDS FOR ATTENTION.) | | | | |
| 40. USUALLY DOES WHAT ADULTS ASK HIM TO DO. | | | | |

| | VERY MUCH LIKE | SOME-WHAT LIKE | VERY LITTLE LIKE | NOT AT ALL LIKE |
|---|---|---|---|---|
| 41. REQUIRES THE COMPANY OF OTHER CHILDREN; FINDS IT DIFFICULT TO WORK OR PLAY BY HIMSELF. | | | | |
| 42. RESPONDS TO FRUSTRATION OR DISAPPOINTMENT BY BECOMING SULLEN, WITHDRAWN, OR SULKY. | | | | |
| 43. DEMONSTRATES IMAGINATIVENESS AND CREATIVITY IN HIS USE OF TOYS AND PLAY MATERIALS. | | | | |
| 44. INSISTS ON MAINTAINING HIS RIGHTS, E. G., WILL NOT YIELD HIS PLACE AT PAINTING, OR AT THE CARPENTRY BENCH, ETC.; INSISTS ON GETTING HIS TURN ON THE SLIDE OR IN GROUP GAMES, ETC. | | | | |
| 45. IS WANTED AS A PLAYMATE BY OTHER CHILDREN. | | | | |
| 46. IS LETHARGIC OR APATHETIC; HAS LITTLE ENERGY OR DRIVE. | | | | |
| 47. HAS A TENDENCY TO DISCONTINUE ACTIVITIES AFTER EXERTING A MINIMUM OF EFFORT. | | | | |
| 48. IS GENERALLY A HAPPY CHILD. | | | | |
| 49. APPROACHES NEW TASKS TIMIDLY AND WITHOUT ASSURANCE; SHRINKS FROM TRYING NEW THINGS. | | | | |
| 50. WHAT HE DOES IS OFTEN IMITATED BY OTHER CHILDREN. | | | | |

DO NOT MARK IN THIS SPACE

## Table 12

### Chi Square Test of Items From Behavior Inventory - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Usually carefree | 83.6 | 66.7 | 3.4416 |
| Sympathetic, considerate | 60.0 | 64.9 | .2882 |
| Easily distracted | 54.5 | 50.9 | .1511 |
| Very suggestible | 16.4 | 19.3 | .0252 |
| Talks eagerly to adults | 70.9 | 68.5 | .0820 |
| Unduly upset or discouraged | 20.0 | 29.9 | 1.4409 |
| Keeps aloof | 23.6 | 35.1 | 1.7662 |
| Defends or praises effort | 34.6 | 35.1 | .0036 |
| Confident | 72.8 | 73.7 | .0131 |
| Jealous | 14.6 | 31.6 | 3.6506 |
| Methodical and careful | 65.4 | 61.4 | .1979 |
| Rarely influential | 41.8 | 35.1 | .5361 |
| Figures out things for himself | 70.9 | 59.6 | 1.5637 |
| Prefers habitual | 60.0 | 57.9 | .0513 |
| Appears to trust abilities | 78.1 | 77.2 | .0158 |
| Little respect for other's rights | 41.9 | 31.6 | 1.2646 |
| Disinterested in quality | 23.6 | 31.6 | .8821 |
| Responds to frustration | 27.3 | 28.0 | .0089 |
| Excessive seeking of attention | 38.2 | 47.4 | .9646 |
| Sticks with job until finished | 67.3 | 68.4 | .0169 |
| Goes about activities | 74.5 | 77.2 | .1072 |
| Needs to be urged | 32.7 | 43.8 | 1.4666 |
| Even-tempered | 67.3 | 63.2 | .2088 |
| Reluctant to talk to adults | 36.4 | 31.6 | .2859 |
| Works earnestly | 65.4 | 61.4 | .1979 |
| Quarrelsome for minor reasons | 29.0 | 26.3 | .1077 |
| Does not need attention | 49.1 | 56.2 | .5580 |
| Gives up easily | 40.0 | 43.8 | .1712 |
| Doesn't like to be interrupted | 56.4 | 49.1 | .5887 |
| Welcomes changes | 72.7 | 70.2 | .0893 |
| Settles difficulties | 50.9 | 49.1 | .0357 |
| Reluctant to use imagination | 21.8 | 33.4 | 1.8542 |
| Likes to socialize with teacher | 72.7 | 84.2 | 1.4621 |
| Won't engage in activities | 36.3 | 38.6 | .0595 |
| Eager to inform other children | 60.0 | 59.7 | .0014 |
| Emotional response | 38.1 | 31.6 | .5377 |
| Uncooperative | 32.7 | 29.9 | .1098 |
| Usually polite to adults | 78.2 | 73.7 | .3095 |
| Asks questions | 56.4 | 49.1 | .5887 |
| Usually does as told | 78.2 | 82.4 | .3240 |

(Table continued on next page)

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Requires company | 38.1 | 36.8 | .0214 |
| Responds to frustration | 23.6 | 28.0 | .2868 |
| Demonstrates imaginativeness | 72.7 | 56.1 | 3.3542 |
| Maintains rights | 63.6 | 52.7 | 1.3928 |
| Wanted for a playmate | 72.8 | 66.7 | .4863 |
| Lethargic | 12.7 | 28.1 | 3.1524 |
| Exerts minimum effort | 34.5 | 47.3 | 1.9017 |
| Generally happy | 90.9 | 77.2 | 2.9534 |
| Approaches new tasks timidly | 34.5 | 31.6 | .1113 |
| Often imitated | 43.6 | 42.1 | .0268 |

Note.--Figures are in terms of the combined percent which were evaluated as "very much like" and "somewhat like."

[a] N = 55.

[b] N = 57.

Table 13

Chi Square Test of Items
From Behavior Inventory - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Usually carefree | 77.3 | 71.7 | 75.0 | .4427 |
| Sympathetic, considerate | 65.2 | 58.7 | 62.5 | .4820 |
| Easily distracted | 53.0 | 52.2 | 52.7 | .0080 |
| Very suggestible | 13.6 | 23.9 | 17.9 | 1.3139 |
| Talks eagerly to adults | 68.2 | 71.7 | 69.6 | .1623 |
| Unduly upset or discouraged | 24.2 | 26.1 | 25.0 | .0492 |
| Keeps aloof | 28.8 | 30.4 | 29.5 | .0354 |
| Defends or praises efforts | 31.8 | 39.1 | 34.8 | .6386 |
| Confident | 72.7 | 73.9 | 73.2 | .0194 |
| Jealous | 22.7 | 23.9 | 23.2 | .0214 |
| Methodical and careful | 60.6 | 67.4 | 63.4 | .5378 |
| Rarely influential | 40.9 | 34.8 | 38.4 | .4302 |
| Figures out things for himself | 62.1 | 69.6 | 65.2 | .6618 |
| Prefers habitual | 53.0 | 67.4 | 58.9 | 2.3099 |
| Appears to trust abilities | 75.8 | 80.4 | 77.7 | .1254 |
| Little respect for other's rights | 30.3 | 45.7 | 36.6 | 2.7520 |
| Disinterested in quality | 24.2 | 32.6 | 27.7 | .9478 |
| Responds to frustration | 22.7 | 34.8 | 27.7 | 1.9680 |
| Excessive seeking of attention | 42.4 | 43.5 | 42.9 | .0123 |
| Sticks with job until finished | 69.7 | 65.2 | 67.9 | .2494 |
| Goes about activities | 75.8 | 76.1 | 75.9 | .0016 |
| Needs to be urged | 37.9 | 39.1 | 38.4 | .0180 |
| Even-tempered | 65.2 | 65.2 | 65.2 | .0001 |
| Reluctant to talk to adults | 34.8 | 32.6 | 33.9 | .0607 |
| Works earnestly | 63.6 | 63.0 | 63.4 | .0041 |
| Quarrelsome for minor reasons | 21.2 | 37.0 | 27.7 | 3.3568 |
| Does not need attention | 48.5 | 58.7 | 52.7 | 1.1337 |
| Gives up easily | 42.4 | 41.3 | 41.9 | .0140 |
| Doesn't like to be interrupted | 50.0 | 56.5 | 52.7 | .4625 |
| Welcomes changes | 71.2 | 71.8 | 71.4 | .0037 |
| Settles difficulties | 53.0 | 45.6 | 50.0 | .5903 |
| Reluctant to use imagination | 22.8 | 34.8 | 27.6 | 1.9680 |
| Likes to socialize with teacher | 77.3 | 80.4 | 78.6 | .0279 |
| Won't engage in activities | 37.9 | 36.9 | 37.5 | .0098 |
| Eager to inform other children | 62.1 | 56.5 | 59.8 | .3536 |
| Emotional response | 28.8 | 43.5 | 34.8 | 2.5775 |
| Uncooperative | 31.8 | 30.4 | 31.2 | .0016 |
| Usually polite to adults | 75.8 | 76.1 | 75.9 | .4635 |
| Asks questions | 50.0 | 56.5 | 52.7 | .0504 |
| Usually does as told | 80.3 | 80.4 | 80.3 | .0885 |

(Table continued on next page)

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Requires company | 36.3 | 39.1 | 37.5 | .0015 |
| Responds to frustration | 25.8 | 26.0 | 25.9 | .0014 |
| Demonstrates imaginativeness | 65.2 | 63.1 | 64.3 | .2574 |
| Maintains rights | 56.0 | 60.9 | 58.1 | .1872 |
| Wanted for playmate | 71.2 | 67.4 | 69.7 | 1.4741 |
| Lethargic | 16.6 | 26.1 | 20.6 | .1868 |
| Exerts minimum effort | 39.4 | 43.4 | 41.1 | .3352 |
| Generally happy | 86.3 | 80.4 | 84.0 | .0064 |
| Approaches new tasks timidly | 33.4 | 32.6 | 33.0 | .0123 |
| Often imitated | 42.4 | 43.5 | 42.8 | .0241 |

Note.--Figures are in terms of the combined percent which were evaluated as "very much like" and "somewhat like."

[a]N = 66.

[b]N = 46.

## Appendix B

### Preschool Inventory

Examination copy, answer sheet, manual,
and chi square analysis of performance
by sex and race.

Figure 2

#1

2nd

WEEK

*Budget Bureau No. 116-6504*
*Approval expires March 31, 1966*

# PRESCHOOL INVENTORY

**Time started** ____________
**Time finished** ____________

**Child's name** ____________________ **Date of test** ____________
**Place of test** ______________ **Child Development Center ID number** ______
**Child's ID number** __________ **Examiner's staff ID number** ____________
**Child's major language** ________________________________
**Language in which test was given** ________________________________

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CAP-HS FORM 42 JUN 68

## PRESCHOOL INVENTORY

| Begin by asking the child the following questions: | | KNOWS: YES | NO |
|---|---|---|---|
| 1. What is your name? | 1. | ____ | ____ |
| 2. If child gives first name only, probe for last name. For example, "Johnny what? What's your last name?" | 2. | ____ | ____ |
| 3. Give the child a sheet of plain white paper and a crayon and say, "Draw me a picture of a man. . . a whole man, not just part of a man." Then do the same with "Now draw a picture of a woman. . . a whole woman, not just part of a woman." | 3. | ____ | ____ |
| 4. How old are you? ____________ | 4. | ____ | ____ |
| 5. When is your birthday? (Score yes for month or date) ______________ | 5. | ____ | ____ |
| 6. Where do you live? (Address, location of housing project, etc.) | 6. | ____ | ____ |
| 7. What school will you go to? ______________________ | 7. | ____ | ____ |
| 8. What is your teacher's name? ______________________ | 8. | ____ | ____ |
| 9. "Who are some of the children in your group?" (Probe for four names. If child says first name only, probe for last name; e.g. "Tommy? Tommy who?") Circle number of first names given. | 9. | 0 1 2 3 4 | |
| 10. Circle number of last names given. | 10. | 0 1 2 3 4 | |

I. Point to the following parts of the examiner's body and say, "What's this?"
II. For all items missed in 11-20, go through again, say, "show me your____."

| | | I. | | | II. | |
|---|---|---|---|---|---|---|
| | | Gives Name | Wrong | D.K. | Shows | Wrong or D.K. |
| 11. Ear | 11. | ____ | ____ | ____ | ____ | ____ |
| 12. Finger | 12. | ____ | ____ | ____ | ____ | ____ |
| 13. Neck | 13. | ____ | ____ | ____ | ____ | ____ |
| 14. Back | 14. | ____ | ____ | ____ | ____ | ____ |
| 15. Eye | 15. | ____ | ____ | ____ | ____ | ____ |
| 16. Elbow | 16. | ____ | ____ | ____ | ____ | ____ |
| 17. Heel | 17. | ____ | ____ | ____ | ____ | ____ |
| 18. Shoulder | 18. | ____ | ____ | ____ | ____ | ____ |
| 19. Eyebrow | 19. | ____ | ____ | ____ | ____ | ____ |
| 20. Knee | 20. | ____ | ____ | ____ | ____ | ____ |

| Now ask the child these questions: "How many _____ do you have?" | | Right | Wrong | D.K. |
|---|---|---|---|---|
| 21. Eyes | 21. | ___ | ___ | ___ |
| 22. Noses | 22. | ___ | ___ | ___ |
| 23. Ears | 23. | ___ | ___ | ___ |
| 24. Heads | 24. | ___ | ___ | ___ |
| 25. Feet | 25. | ___ | ___ | ___ |
| 26. Hands | 26. | ___ | ___ | ___ |
| 27. Toes | 27. | ___ | ___ | ___ |
| 28. Mouths | 28. | ___ | ___ | ___ |
| 29. Necks | 29. | ___ | ___ | ___ |
| 30. Broken arms (or something else the child obviously doesn't have, to elicit "none" or "not any") | 30. | ___ | ___ | ___ |
| Now ask, "How many wheels does a ______ have?" | | | | |
| 31. Car | 31. | ___ | ___ | ___ |
| 32. Bicycle | 32. | ___ | ___ | ___ |
| 33. Tricycle (or baby bicycle) | 33. | ___ | ___ | ___ |
| 34. Wheelbarrow | 34. | ___ | ___ | ___ |
| 35. Rowboat | 35. | ___ | ___ | ___ |

36. "Let's hear you count out loud". If no responses, start child by saying, "One. . ." Circle highest number given, up to five. 36. 1 2 3 4 5

37. (Hold up piece of paper). Say, "Do you know what a corner is? Show me." 37. _______ can _______ can't

38. "How many corners does this sheet of paper have?" 38. _______ knows _______ doesn't

For the next few items take out the box of 12 checkers, all the same color. Give the child the opportunity to manipulate them briefly.

Seeing that all the checkers touch one another and occupy more or less the same area, (all flat on table), put the checkers in two groups in front of the child, as follows and ask (pointing first to one, then the other):

| Groups of checkers | | Right | Wrong |
|---|---|---|---|
| 39. 2 & 8 "Which one has more checkers in it?" | 39. | _____ | _____ |
| 40. 5 & 6 "Which one has more checkers in it?" | 40. | _____ | _____ |
| 41. 6 & 6 "Which one has more checkers in it?" | 41. | _____ | _____ |

3.

42. Recombine and make two groups, 8 and 2. Say, pointing, "Which group has fewer/less?" 42. ____ ____

Take away all but 5 of the checkers. Instruct the child as follows: "Put these checkers next to each other in a line/row." See to it that a half-inch space is made between each two checkers. Give whatever guidance is needed to yield a fairly straight row. Say:

| | | | Right | Wrong |
|---|---|---|---|---|
| 43. "Give me the middle one." | (Note: Credit first-last in terms of a child's choice; i.e. either end of the row of blocks. All subsequent choices should be consistent with that choice, however.) | 43. | ____ | ____ |
| 44. "Give me the first one." | | 44. | ____ | ____ |
| 45. "Give me the last one." | | 45. | ____ | ____ |
| 46. "Give me the second one." | | 46. | ____ | ____ |
| 47. "Give me the next-to-last one." | | 47. | ____ | ____ |

Next, line up the checkers in a row, all touching. Take out the two black checkers and stack one on top of the other at one end to make an engine. Say, "Let's pretend this is a train. You know what a train is, don't you? You know, it has a lot of cars, one after the other, like this."

48. "Do you know what we call the first car, the one that pulls the train? (Probe to elicit engine.) 48. ____ ____

49. "What do we call the last car on a freight train?" If no correct response is given to either of the above: 49. ____ ____

50. "What pulls the train, the engine or the caboose?" 50. ____ ____

51. "What do we call the last car on the freight train, the engine or the caboose? 51. ____ ____

Detach the page with the line, triangle, circle, and square drawn on it. Give it to the child. Ask him:

| | | | | I. | | II. | |
|---|---|---|---|---|---|---|---|
| | | | Gives Name | Gives Similar Object | D.K. or Wrong | Points Yes | Points No |
| 52. "What do we call this? | (Circle) | 52. | ____ | ____ | ____ | ____ | ____ |
| 53. | (Line) | 53. | ____ | ____ | ____ | ____ | ____ |
| 54. | (Square) | 54. | ____ | ____ | ____ | ____ | ____ |
| 55. | (Triangle) | 55. | ____ | ____ | ____ | ____ | ____ |

If child cannot name shape, ask him to point to ones missed. (Column II).

Using the same sheet, say to the child, "Now I'd like you to make some drawings. Make one like this," (and point to):

| | | Recognizable | Unrecognizable |
|---|---|---|---|
| 56. Line | 56. | | |
| 57. Circle | 57. | | |
| 58. Square | 58. | | |
| 59. Triangle | 59. | | |

Now ask the child to point to "the one which is most like a __________"

| | | Right | Wrong |
|---|---|---|---|
| 60. Wheel | 60. | | |
| 61. Window | 61. | | |
| 62. Piece of string | 62. | | |
| 63. Tent or teepee | 63. | | |
| 64. Ice cream cone | 64. | | |
| 65. Plate/dish | 65. | | |
| 66. Stick | 66. | | |

Take the paper from the child and continue with: "Which is bigger, a ________ or a ________?"

| | | | |
|---|---|---|---|
| 67. Ball or bicycle | 67. | | |
| 68. Tree or flower | 68. | | |
| 69. Telephone or television | 69. | | |
| 70. Man or boy | 70. | | |
| 71. Mosquito or grasshopper | 71. | | |
| 72. Fly or butterfly | 72. | | |

"Which usually goes slower, a ____ or a ___?"

| | | | |
|---|---|---|---|
| 73. Horse or dog | 73. | | |
| 74. Car or bicycle | 74. | | |
| 75. Train or rocket | 75. | | |

"Which is heavier, a _____ or a _______?"

| | | | |
|---|---|---|---|
| 76. Butterfly or bird | 76. | | |
| 77. Brick or shoe | 77. | | |
| 78. Feather or fork | 78. | | |

5.

Say, "Good. Now let's try something different.
"I want you to do some things for me."

| | | Right | Wrong |
|---|---|---|---|
| 79. Close your eyes. | 79. | | |
| 80. Raise your hand. | 80. | | |
| 81. Show me your teeth. | 81. | | |
| 82. Show me your fingernails. | 82. | | |
| 83. Wiggle. | 83. | | |
| 84. Say "hello" very loudly. | 84. | | |
| 85. Say "hello" very softly. | 85. | | |
| 86. Stand up. | 86. | | |
| 87. Turn around (all the way around). | 87. | | |
| 88. Face the door. | 88. | | |
| 89. Jump. | 89. | | |
| 90. Sit down. | 90. | | |

Thank the child and continue with, "I want you to think of all the things your mother gives you to eat at mealtime, and the things she gives you to eat with.

91. Name all the things you can think of." (Copy verbatim, if possible, in this space: ________

91. ____ 0 ____ 1-3 ____ 4-6 ____ 7-9 ____ 10+

________________________________________

If the child says nothing after 10 seconds, Say "you know like bread and forks." Stop after 30 seconds if child says nothing. Let him continue if he appears to be still thinking.

Now place the 8 crayola crayons (or any similar high intensity crayons of red, orange, yellow, green, blue, purple, brown, and black) on the table. Mix them up and line them up about 1/2 inch apart. Say "What color is this" for each (Column I). If child does not name all correctly, for those missed, say, "Give me the ___ one," (Column II). Replace the one he hands you each time.

| | | I. Names | | II. Gives | |
|---|---|---|---|---|---|
| | | Right | Wrong | Right | Wrong |
| 92. Red | 92. | | | | |
| 93. Yellow | 93. | | | | |
| 94. Orange | 94. | | | | |
| 95. Green | 95. | | | | |
| 96. Blue | 96. | | | | |
| 97. Purple | 97. | | | | |
| 98. Brown | 98. | | | | |
| 99. Black | 99. | | | | |

With the crayons still on the table ask him the following questions. If he gives an incorrect answer or indicates he doesn't know, have him show you or give you the color. If he still misses, score wrong. Be certain there is a sheet of white paper in sight for the snow question.

| I. "What color is _______?" II. "Show me." | | I. Says | | II. Pointed | |
|---|---|---|---|---|---|
| | | Right | Wrong | Right | Wrong |
| 100. Fire (red, orange, or yellow) | 100. | | | | |
| 101. Grass | 101. | | | | |
| 102. Snow | 102. | | | | |
| 103. Carrot | 103. | | | | |
| 104. The sky (blue) | 104. | | | | |
| 105. Night (blue, black) | 105. | | | | |

"Have you ever been on a swing? You know how a swing goes -- up and down and back and forth? (Accompany with gesture).

| | | Says | | Shows | |
|---|---|---|---|---|---|
| | | Right | Wrong | Right | Wrong |
| 106. Which way does a saw go? | 106. | | | | |
| 107. Which way does an elevator go? | 107. | | | | |
| 108. Which way does a ferris wheel go? | 108. | | | | |
| 109. Which way does a phonograph record go? | 109. | | | | |
| 110. Which way does a waterfall go? | 110. | | | | |

Write down in the blank exactly what the child says. Code responses as 2 (clear, correct), 1 (approximation), 0 (wrong). Mark D.K. if no response is given or the child says, "I don't know."

| | | "2" | "1" | Wrong | D.K. |
|---|---|---|---|---|---|
| 111. When do we eat breakfast? _______________ | 111. | | | | |
| 112. What day do people go to church? _______________ | 112. | | | | |
| 113. What day is today? _______________ | 113. | | | | |
| 114. When your mother says it's time to go to bed, what is it like outside? | 114. | | | | |
| 115. What do we call the time of year when it's hottest? | 115. | | | | |
| 116. What do we call the time of year when it's coldest? | 116. | | | | |
| 117. What time of year is it now? _______________ | 117. | | | | |
| 118. If your mother wanted to call up and talk to a friend, what would she use? | 118. | | | | |

7.

| | | "2" | "1" | Wrong | "0" |
|---|---|---|---|---|---|
| 119. If you want to find a lion where would you look? | 119. | | | | |
| 120. If you wanted to buy some gas, where would you go? | 120. | | | | |
| 121. If you were sick, who would you go to? | 121. | | | | |
| 122. If you wanted to find a boat, where would you look? | 122. | | | | |
| 123. If you wanted to read something, what would you do? | 123. | | | | |

**Take out the three cars, red, yellow, and blue; take out the three boxes, black, white and green. Be sure the black box is bottoms up. After each item, make sure all cars and all boxes are visible and available; i.e., do not leave a car in a box, etc. Give each instruction only once. Make sure he is looking and listening, and say the words slowly.**

| | |
|---|---|
| 124. Put a car on a box. | 124. ON ________ |
| 125. Put a car in a box. | 125. IN ________ |
| 126. Put a car under a box. | 126. UNDER ________ |
| 127. Put the red car on the black box. | 127. RED ____ BLACK ____ ON ____ |
| 128. Put the blue car on the green box. | 128. BLUE ____ ON ____ GREEN ____ |
| 129. Put the yellow car on the little box. | 129. YELLOW ____ ON ____ LITTLE ____ |
| 130. Put one car in the middle-sized box. | 130. ONE ____ IN ____ MID-S ____ |
| 131. Put all the cars on one side of the table and all the boxes on the other side. | 131. ALL CARS ___ ONE ___ ALL BOXES ___ OTHER ___ |
| 132. Put 3 cars in the big box. | 132. 3 ____ IN ____ BIG ________ |
| 133. Put 2 cars behind the box in the middle. | 133. 2 ____ BEHIND ____ MIDDLE ____ |
| 134. Give everything to me. | 134. All cars and all boxes ______ |

**In this section, write down exactly what the child says. Also mark category, as indicated in the manual.**

| | | FUNCTION | | ASSOCIATION | WRONG | D.K. |
|---|---|---|---|---|---|---|
| | | Supportive | Restrictive | | | |
| 135. What does a doctor do?<br>____________________ | 135. | | | | | |
| 136. What does a policeman do?<br>____________________ | 136. | | | | | |
| 137. What does a dentist do?<br>____________________ | 137. | | | | | |

| | | FUNCTION | | ASSOCIATION | WRONG | D.K. |
|---|---|---|---|---|---|---|
| | | Supportive | Restrictive | | | |
| 138. What does a teacher do?<br>______________________ | 138. | | | | | |
| 139. What does a father do?<br>______________________ | 139. | | | | | |
| 140. What does a nurse do?<br>______________________ | 140. | | | | | |
| 141. What does a mother do?<br>______________________ | 141. | | | | | |
| 142. What does a soldier do?<br>______________________ | 142. | | | | | |

Detach the printed sheet of pictures and give it to the child. Say, "See these pictures? I'm going to draw a line from the boy to the cake, like this." Draw a line with the pencil. Hand crayon to child and say, "Now you do it." Take his hand and help him trace it, if necessary.

| | | Yes | No |
|---|---|---|---|
| 143. Traces successfully. | 143. | | |

After you have ascertained that the child can draw a line, say, "I want you to draw some more lines for me, one at a time. Draw a line from the ____ to the _____."

| | | Yes | No |
|---|---|---|---|
| 144. Bird to wagon | 144. | | |
| 145. Clock to cake | 145. | | |
| 146. Dog to boy | 146. | | |
| 147. Girl to ball | 147. | | |
| 148. Bird to other bird | 148. | | |

9.

## TEACHER REPORT ON CHILD
(Need not be done at same time as rest of test)

| | YES | NO |
|---|---|---|
| 149. Can put on jacket or shirt without help. | | |
| 150. Can zip or button jacket. | | |
| 151. Wears shoes. | | |
| 152. Can put on shoes (if correct shoe is identified). | | |
| 153. Can put on correct shoes without help. | | |
| 154. Can tie shoes. | | |
| 155. Can carry out simple verbal instructions pertaining to clothing, food arrangements, etc. ("Go put on your jacket." "Pass the cookies to the children.") | | |
| 156. Can go about immediate home and/or school neighborhood unattended. Can get to school alone (attendant provided at major street crossings). Rural: can get to bus stop and wait without supervision. | | |
| 157. Knows meaning of red-green traffic lights. (Permissible to ask child if there is no opportunity to observe on this). | | |
| 158. Can wash hands. | | |
| 159. Can wash and dry hands and face. | | |
| 160. Notifies teacher of his toilet needs. | | |
| 161. Can care for himself in the bathroom without help: flushes, cleans, fixes clothing. | | |

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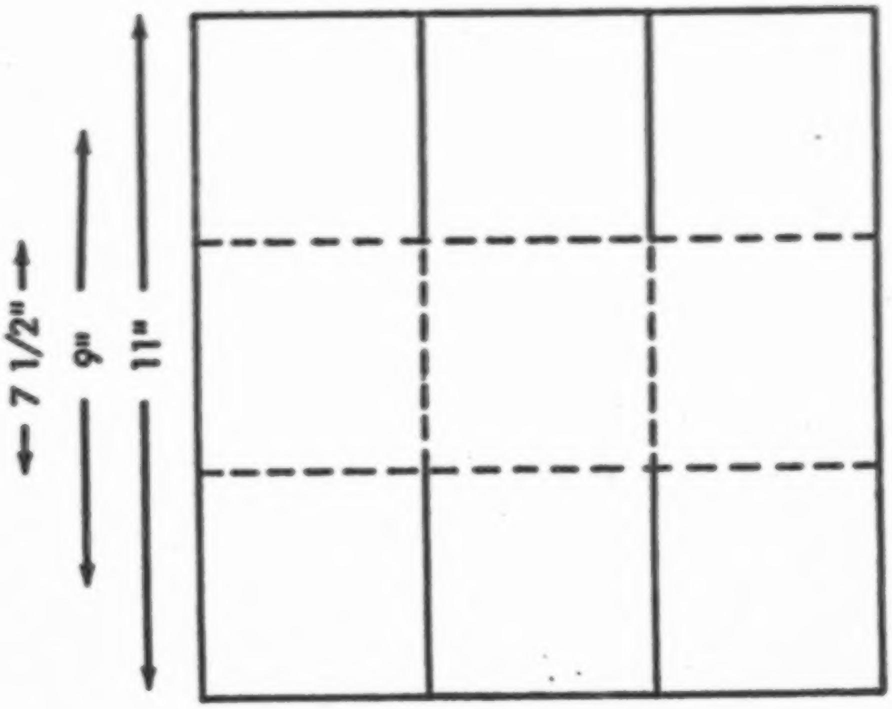
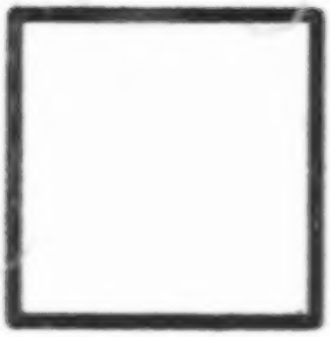
Construction of the three boxes required in items 124-134 can be a relatively simple matter. A diagram is provided below for patterns of cutting. Fold along the dotted lines and cut along the solid lines.

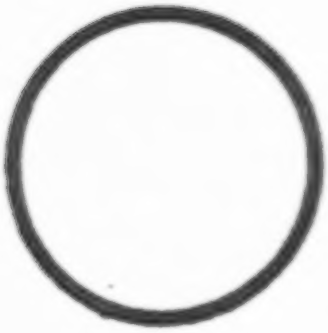
We suggest the following dimensions for the size of the paper:

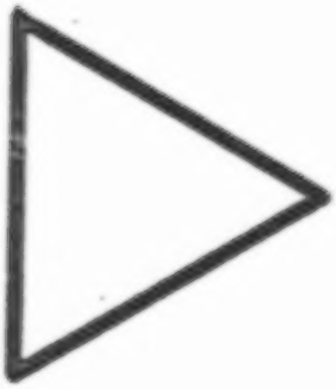
| | |
|---|---|
| Black paper box | 7 1/2 inches square |
| Green paper box | 9 inches square |
| White paper box | 11 inches square |

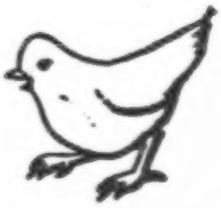
Use construction paper, which you may have to purchase.

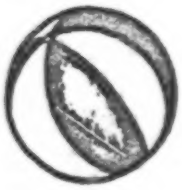


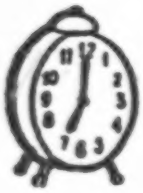


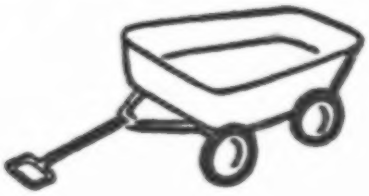


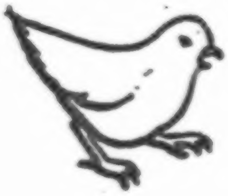


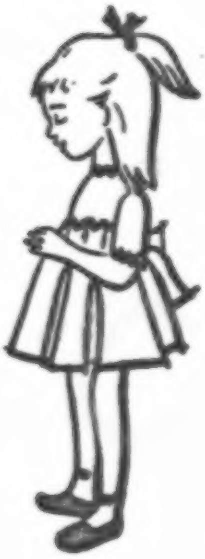


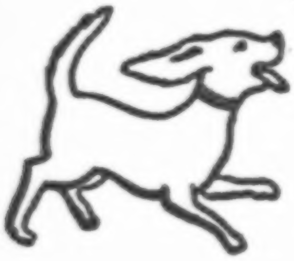


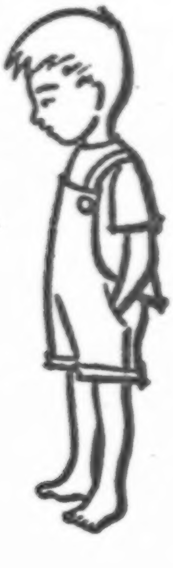












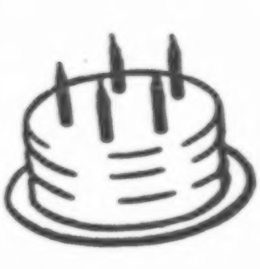
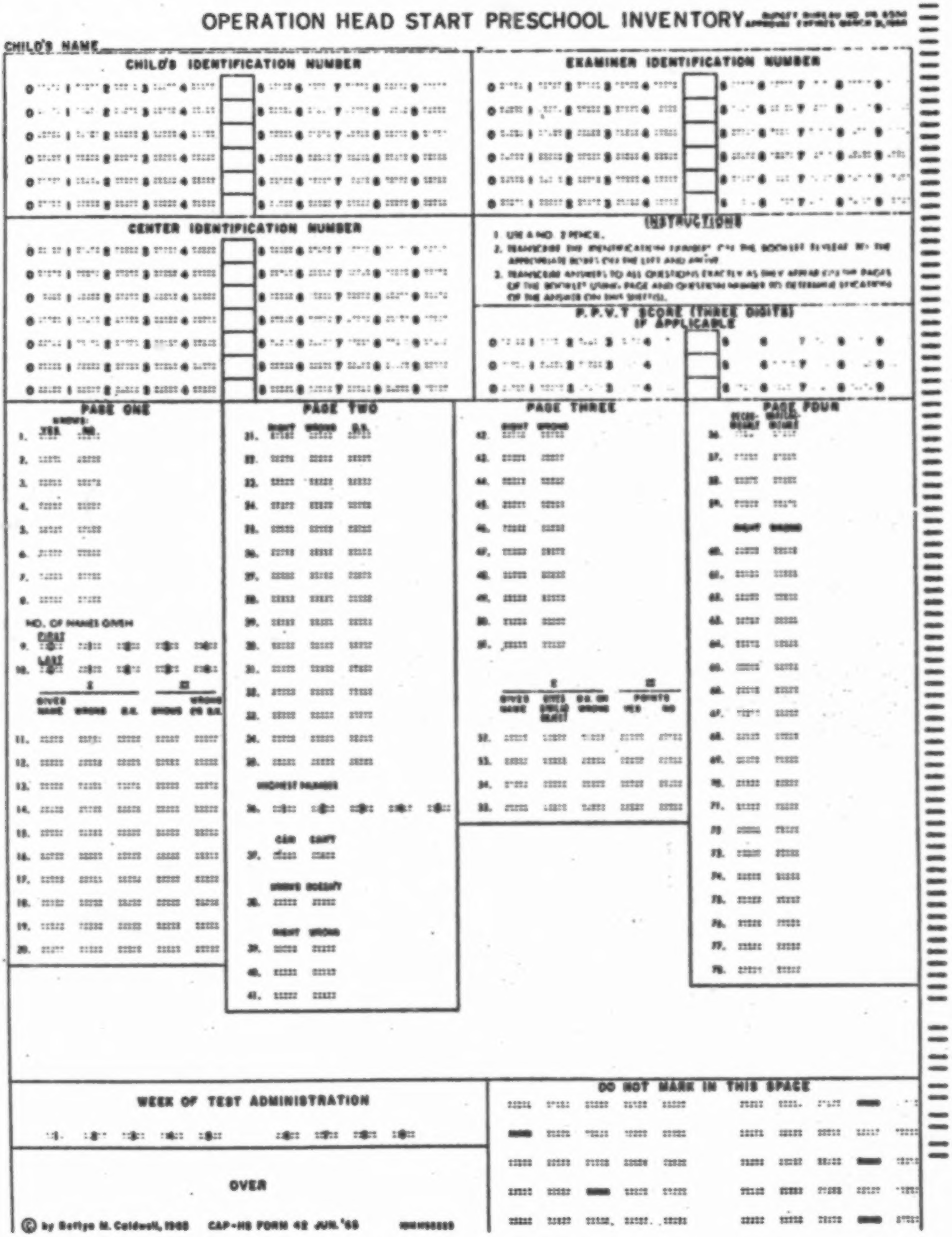


Figure 3



OPERATION HEAD START PRESCHOOL INVENTORY

CHILD'S NAME

CHILD'S IDENTIFICATION NUMBER

EXAMINER IDENTIFICATION NUMBER

CENTER IDENTIFICATION NUMBER

INSTRUCTIONS

1. USE A NO. 2 PENCIL.

P.P.V.T SCORE (THREE DIGITS) IF APPLICABLE

PAGE ONE

PAGE TWO

PAGE THREE

PAGE FOUR

WEEK OF TEST ADMINISTRATION

DO NOT MARK IN THIS SPACE

OVER

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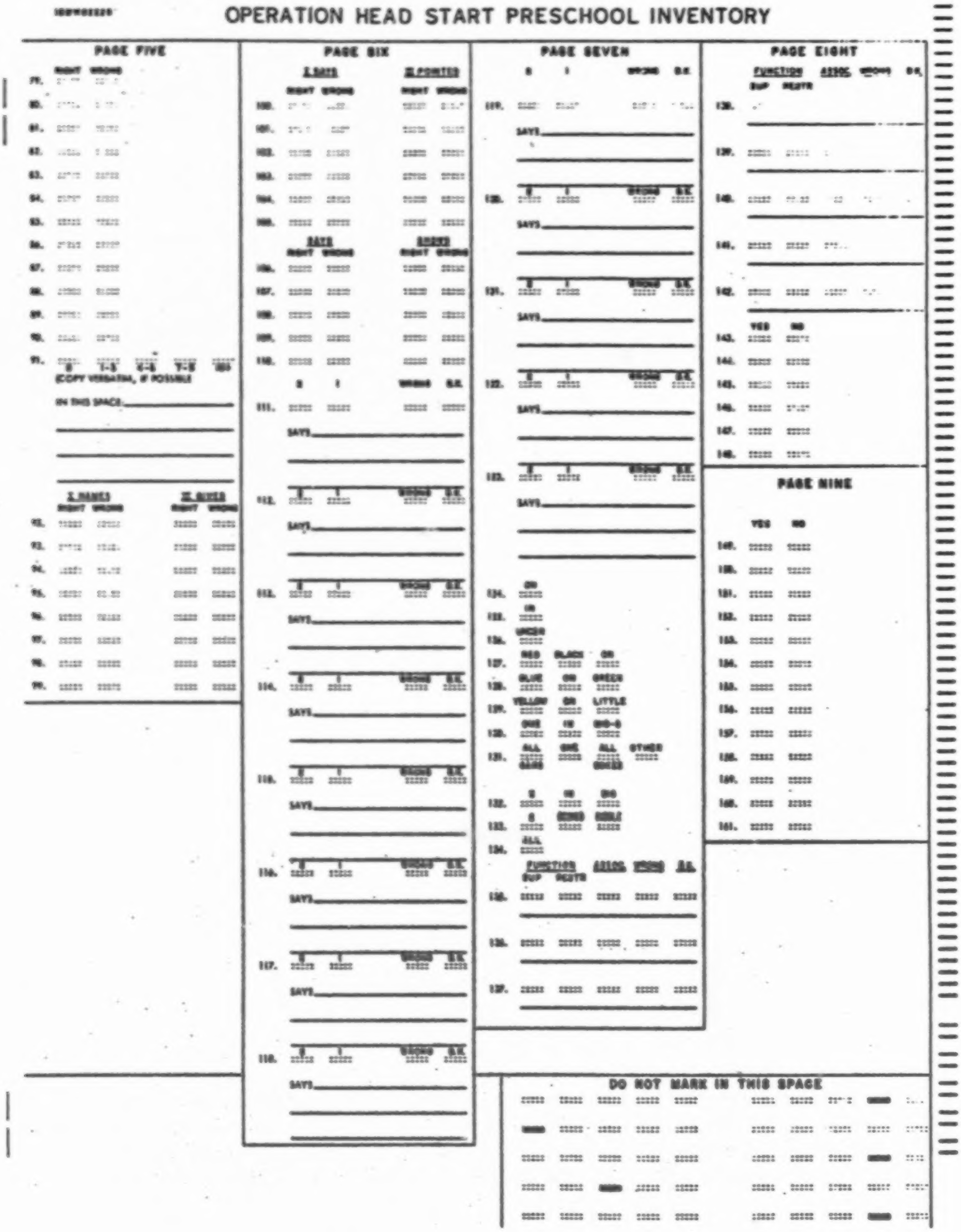

## OPERATION HEAD START PRESCHOOL INVENTORY

### PAGE FIVE

RIGHT WRONG
79.
80.
81.
82.
83.
84.
85.
86.
87.
88.
89.
90.
91. 0 1-3 4-6 7-9 10+

(COPY VERBATIM, IF POSSIBLE

IN THIS SPACE:

I. NAMES RIGHT WRONG — II. GIVES RIGHT WRONG
92.
93.
94.
95.
96.
97.
98.
99.

### PAGE SIX

I. SAYS RIGHT WRONG — II. POINTS TO RIGHT WRONG
100.
101.
102.
103.
104.
105.

SAYS RIGHT WRONG — SHOWS RIGHT WRONG
106.
107.
108.
109.
110.

2 1 WRONG D.K.
111. SAYS
112. 2 1 WRONG D.K. SAYS
113. 2 1 WRONG D.K. SAYS
114. 2 1 WRONG D.K. SAYS
115. 2 1 WRONG D.K. SAYS
116. 2 1 WRONG D.K. SAYS
117. 2 1 WRONG D.K. SAYS
118. 2 1 WRONG D.K. SAYS

### PAGE SEVEN

2 1 WRONG D.K.
119. SAYS
120. 2 1 WRONG D.K. SAYS
121. 2 1 WRONG D.K. SAYS
122. 2 1 WRONG D.K. SAYS
123. 2 1 WRONG D.K. SAYS
124. ON
125. IN
126. UNDER
127. RED BLACK OR
128. BLUE OR GREEN
129. YELLOW OR LITTLE
130. ONE IN BIG-E
131. ALL [illegible] ONE ALL [illegible] OTHER
132. [illegible] IN BIG
133. [illegible] [illegible] [illegible]
134. ALL

FUNCTION SUP RESTR ASSOC. WRONG D.K.
135.
136.
137.

### PAGE EIGHT

FUNCTION SUP RESTR ASSOC. WRONG D.K.
138.
139.
140.
141.
142.

YES NO
143.
144.
145.
146.
147.
148.

### PAGE NINE

YES NO
149.
150.
151.
152.
153.
154.
155.
156.
157.
158.
159.
160.
161.

DO NOT MARK IN THIS SPACE

Figure 4

## PRESCHOOL INVENTORY MANUAL

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This Inventory is designed to find out whether the child has acquired certain skills that are ordinarily observable in children by the time they are five or six years of age. It is not a test of intelligence. The items represent a sample of some familar types of material that are often included in a kindergarten curriculum.

This test requires minimal familiarity with procedures used in standardized testing and can be easily administered by the teacher, teacher-aide, or trained volunteer. The scoring system has been arranged so that the barest minimum of interpretation is required; for most items the child's responses can be assigned to a response category with no difficulty. As a guiding principle, the tester should remember that this Inventory is intended to show what concepts the child has and which ones he lacks so that the Head Start summer enrichment program can begin to remedy the deficits. Thus it is important not to coach the child during the test to raise his score; many children in the Head Start program are expected to score very low on the pretest--otherwise Head Start could not benefit them. On the other hand, the tester may have the feeling that a child knows more than he reveals and that a little extra patience or encouragement will enable him to show his knowledge more fully. If a child does not "produce," the tester should go slowly, offer more praise, or perhaps even repeat the item (unless instructed not to do so) in an effort to elicit responses from the child. Some children respond to such encouragement, while others do not. It is important that the tester not waste time over-encouraging a child who simply cannot perform easily on the test items. Once it becomes apparent that the child cannot or will not respond, the tester should abandon efforts to keep on coaxing. It is important to know that a child freezes in a test situation. Excessive coaxing should be avoided also in the interest of preventing a large number of failures from accumulating; if the child makes mistakes or cannot respond, it is sometimes better to pass over the failures quickly without making an issue of them. If the examiner has in mind the comfort of the child in the test situation he will be aware of the sources of the child's reticence and of the effects of various ways of dealing with it.

Since there are no time limits on this test, it is up to the individual examiner to decide how long to work with each child. If one encounters many reticent children the testing procedure could take an inordinate amount of time. For this reason the examiner must guard against becoming so involved in coaxing individual children that the procedure drags on. In certain cases, however, he will want to take a little extra time to give the child a chance to perform up to his ability.

To administer this Inventory, the examiner should take the child from the main classroom to another area which is quiet. A child who is busily engaged in some activity should not be disturbed for purposes of being given the Inventory; he should be brought into the situation in a cooperative frame of mind. The Inventory should be given in a place which is familiar to the child. On the basis of field testing, it is fairly safe to predict that the children (and the examiners) will enjoy the experience.

The special equipment required for this test is simple and easy to obtain. Some of the materials are supplied with copies of the Inventory booklet; other materials should be purchased by the individual Centers. Items supplied are the Inventory booklets and patterns for the construction of green, white, and black boxes. Local units need to buy the following items:

Three small cars painted red, yellow, and blue.
("Matchbox" cars #20, #31, and #65 are very good).

One eight-crayon box of Crayola;
(or other high saturation crayons).

One box of checkers, of which twelve red and two black checkers will be used.

The examiner should take time to become familiar with the Inventory before he administers it. Practice sessions with two or three children would be helpful.

## SCORING

In order to simplify the Inventory booklet, comments and instructions have been kept brief. Directions for scoring most of the items are to be found in the Inventory itself. However, some of the items need further clarification in order to make sure that the responses are scored and recorded in the same way by all examiners. In the following section, only those items which might possibly need additional clarification will be discussed. The scoring suggestions represent an attempt to answer examiners questions in advance. If an examiner cannot make a decision on the scoring, he should record verbatim the production of the child and indicate his doubts about the scoring. However, such action should be resorted to only in extreme instances and should be clearly marked. As the Inventory is to be machine scored, some score for every item is essential.

| ITEM NO. | COMMENTS |
|---|---|
| 4 - 7 | The examiner should try to have in advance the information which he is asking of the child. In this way he will know immediately whether or not the child's answer is correct. It is best to record the child's exact response, alongside the item. This will make it easier if the tester needs to recheck for accuracy. |

11 - 20 Be certain to go all through the list before asking the child to point to the body parts. Thus, if E asks, "What is this?" pointing to the elbow, and the child gives no answer, E should not then immediately ask, "Show me your elbow." He should go right on to heel, shoulder, etc., and then ask for all the items that the child could not name. If the child gives a wrong answer (e.g., says "hand" when E holds up one finger), do not check the "Gives Name" column. Reserve a check in that column for correct answers only.

33 Many children do not distinguish a bicycle from a tricycle. If the child says "2" for tricycle, ask about a baby's bicycle.

39 - 41 The checkers are placed flat on the table in two groups for each item. The two numbers in each question tell how many checkers there should be in each group. In a single group the checkers should be arranged so that they touch one another, but the groups must be separated from one another. DO NOT STACK THE CHECKERS.

43 - 47 If the five checkers are lined up so that they touch one another, the examiner should spread them apart--while keeping the line straight--so that the separate position of each checker can be viewed by the child.

50 - 51 If the child gets 48 right, credit 50 "right"; if the child gets 49 right, credit 51.

52 - 55 The child is asked to name all four shapes first. If he gives the correct name for the shape, place a check under the column headed "Gives Name" in the space next to the item. If the child names some object that resembles the shape, write down the child's exact words under the column "Similar Object"--e.g., for circle: wheel, dish ring; for square: box, window; for line: rope, pencil, string; for triangle: tent, roof, Christmas tree, etc.. If the child names an object that is not reasonably similar in shape, mark it under "wrong."

Please record the child's actual statements. Go through the entire list of items before asking the child to point to the ones missed. (If the child has named them correctly, it is not necessary to have him point.)

56 - 59 In scoring these items, be guided by the column headings. If the drawing produced looks more like a line than like any of the other shapes, then score it as "recognizable." Similarly for all others--if they look somewhat like the shapes asked for and are roughly recognizable as the shapes, then score "recognizable." Sometimes all the drawings will look very much alike--all lines, or all attempts at circles. In those cases, score as "recognizable" only the one that resembles the model. Be lenient.

60 - 66 No substitutions permitted unless the child can justify them; e.g., some modern tents are balloon-shaped. If a child should point to the circle for "tent," then ask him to explain what he means.

79 - 90 Most children think these are a joke, and seem to enjoy carrying out the instructions. Enjoy the joke with them.

91 Credit any item of food or any utensil. Do not credit table. There are regional or ethnic variations (e.g., if the child should say "chop sticks") which should be considered and accepted.

100 - 105 Credit yellow, orange, red, or any variation.

101 Credit green or tan (in regions where appropriate).

102 Credit white only.

103 Credit orange only.

104 Credit blue. If a child says "white," say "What else?"

105 Credit black, purple, dark blue.

106 Credit back and forth, sideways.

107 Credit up and down. If a child says only "up" or only "down" ask "And how else?" Do not give credit unless both directions are mentioned.

108 Credit round and round, or around.

109 Ditto.

110 Credit down.

111 - 123 A child's answer is rated in one of four possible ways:

If there is no doubt about the correctness of the object or event that a child names, check under "2"; if the child seems to have some knowledge or awareness of the object or event, but describes what is asked instead of naming it directly, check under "1"; if the answer is wrong, check under "wrong"; if the child doesn't know or gives no answer, write that down under "doesn't know."

| | 2 | 1 |
|---|---|---|
| 111 | Morning | Early, when we get up. |
| 112 | Sunday (Saturday if explained) | When Mommy doesn't work. |
| 113 | Name of day | First day of week. |
| 114 | Dark, night | Street lights are on. |

| | | |
|---|---|---|
| 115 | Summer | Vacation. |
| 116 | Winter | Christmas time. |
| 117 | Summer | Vacation, Head Start time. |
| 118 | Telephone | Thing on the wall that rings. |
| 119 | Zoo, jungle, circus | In the woods. |
| 120 | Service station | |
| | Filling station | In the car. |
| | Gas or gasoline station | In the gas can. |
| 121 | Doctor, hospital, nurse | Your mother would give you medicine. |
| 122 | Water, river, lake | Where they sell boats. |
| 123 | Get a book | |
| | Go to a library | |

124 - 134 This series of items can be given very quickly, and the children are sure to enjoy them. Scoring is very simple, encompassing some items requiring simply the child's knowledge of the position words (on, in, under,) and in others, his ability to keep several things in mind at once and then carry out the instructions.

It is a good idea to let the children (especially the boys) play with the little cars briefly. It is not necessary to have the boxes and the cars in identical positions at the beginning of each item, but they should all be visible and all available for him to choose. This means removing a car from inside or under a box after each action taken by the child. It is not necessary that all boxes be turned the same way; putting the box into the correct position is part of the item.

As individual examiners are likely to use different marks for "correct" and "incorrect," it is asked that you put a mark on the line only if the child performed that part of the item correctly. Spaces are provided for indicating each part of the item that the child does correctly. For example, if on Item 129, "Put the yellow car on the little box," the child put the blue car in the little box, it would be marked as follows: Yellow____On______ Little_X__.

135 - 142 Record all answers verbatim in this section. This is the only section of the Inventory likely to produce a sample of the child's verbal behavior, his use of language to answer questions in sentences. The scoring categories are essentially the same as those used for Items 111-123, except that in this instance the highest scoring category has been divided into two sub-categories. That is, some sort of function is implied in the question, "What does a _____ do?" All the social roles included might be described as having both supportive and restrictive components. Many persons who have worked with disadvantaged children have reported that these children tend to view authority figures as essentially punitive or restrictive. As one of the stated goals of supplementary educational programs is to foster more favorable perceptions of authority figures, it was deemed advisable to note whether the

child who is able to describe functions of the community figures listed in this section perceives them as largely supportive or restrictive. If the child mentions both supportive and restrictive dimensions, check both. Scoring examples follow.

| | | Function | Association |
|---|---|---|---|
| 135 | Sup. | Helps keep you well.<br>Takes care of you when you are sick. | Goes to hospital. |
| | Restr. | Gives you shots. | |
| 136 | Sup. | Protects the town. | Rides a motorcycle. |
| | Restr. | Arrests people. | |
| 137 | Sup. | Fixes your teeth. | Has a funny chair. |
| | Restr. | Drills holes in your teeth. | |
| 138 | Sup. | Teaches you to read. | Goes to school. |
| | Restr. | Whips you. | |
| 139 | Sup. | Works for his family. | Drives a bus. |
| | Restr. | Makes you stay after school. | |
| 140 | Sup. | Helps keep you well. | Wears a uniform. |
| | Restr. | Makes you clean up your house.<br>Gives you shots. | |
| 141 | Sup. | Loves you, feeds and takes care of you. | Sweeps the floor. |
| | Restr. | Whips you. Makes you do things. | |
| 142 | Sup. | Helps protect his country. | Marches in parades. |
| | Restr. | Kills people, fights. | |

143 - 148 Try to make certain that the child understands what he is to do. If he looks bewildered, return to the example. Otherwise, give no additional help.

## Table 14

## Chi Square Test of Items From Preschool Inventory - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| What is your name? | 98.1 | 89.5 | |
| Last name? | 90.4 | 89.5 | .0258 |
| How old are you? | 80.8 | 87.7 | .5397 |
| When is your birthday? | 28.8 | 40.4 | 1.5849 |
| Where do you live? | 30.8 | 35.1 | .2293 |
| What school will you go to? | 40.4 | 45.6 | .3032 |
| What is your teacher's name? | 75.0 | 75.4 | .0028 |
| Names of children in group? (4+) | 46.2 | 49.1 | .0961 |
| Last names give (none) | 75.0 | 77.2 | .0720 |
| What is this? ear | 100 | 100 | |
| finger | 100 | 96.5 | |
| neck | 86.5 | 91.2 | .2256 |
| back | 94.2 | 91.2 | .0542 |
| eye | 96.2 | 98.2 | |
| elbow | 59.6 | 82.5 | 6.9706** |
| heel | 34.6 | 42.1 | .6441 |
| shoulder | 57.7 | 71.9 | 2.4273 |
| eyebrow | 65.4 | 64.9 | .0027 |
| knee | | | |
| How many eyes do you have? | 92.3 | 89.5 | .0323 |
| noses | 84.6 | 87.7 | .0367 |
| ears | 90.4 | 94.7 | .2526 |
| heads | 90.4 | 93.0 | .0207 |
| feet | 90.4 | 93.0 | .0206 |
| hands | 86.5 | 89.5 | .0311 |
| toes | 9.6 | 19.3 | 1.3360 |
| mouths | 84.6 | 87.7 | .0367 |
| necks | 84.6 | 89.5 | .2215 |
| "broken arms" | 57.7 | 73.7 | 3.1015 |
| How many wheels does a car have? | 48.1 | 61.4 | 1.9516 |
| bicycle | 84.6 | 75.4 | .9089 |
| tricycle | 63.5 | 57.9 | .3528 |
| wheelbarrow | 50.0 | 35.1 | 2.4791 |
| rowboat | 21.2 | 24.6 | .1786 |
| Counting | 84.6 | 93.0 | 1.1829 |
| Show me a corner | 65.4 | 71.9 | .5428 |
| How many corners does a sheet of paper have? | 50.0 | 63.2 | 1.9195 |
| Which has more? 2 & 8 | 82.7 | 91.2 | 1.0895 |
| 5 & 6 | 71.2 | 75.4 | .2557 |
| 6 & 6 | 23.1 | 22.8 | .0011 |

(Table continued on next page)

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Which group has fewer? 8 & 2 | 50.0 | 59.6 | 1.0231 |
| Give me the middle one. | 71.2 | 78.9 | .8863 |
| first | 50.0 | 61.4 | 2.3060 |
| last | 50.0 | 56.1 | .4118 |
| second | 38.5 | 36.8 | .0304 |
| next-to-last | 40.4 | 36.8 | .1441 |
| First car of train | 46.2 | 26.3 | 4.6574* |
| Last car on freight train | 25.0 | 19.3 | .5149 |
| What pulls the train? | 67.3 | 63.2 | .2062 |
| What do we call the last car? | 53.8 | 52.6 | .0161 |
| What do we call this? circle | 46.2 | 45.6 | .0032 |
| line | 38.5 | 38.6 | .0002 |
| square | 30.8 | 24.6 | .5253 |
| triangle | 15.4 | 17.5 | .0020 |
| Drawings by child. line | 98.1 | 96.5 | |
| circle | 94.2 | 89.5 | |
| square | 65.4 | 63.2 | .0587 |
| triangle | 38.5 | 50.9 | 1.6939 |
| Which is more like a wheel? | 94.2 | 89.5 | .3057 |
| window | 87.7 | 97.7 | |
| piece of string | 78.8 | 77.2 | .0433 |
| tent or teepee | 75.0 | 82.5 | .9080 |
| ice cream cone | 38.5 | 40.4 | .0406 |
| plate or dish | 67.3 | 70.2 | .1042 |
| stick | 88.5 | 91.2 | .0258 |
| Bigger? ball or bicycle | 76.9 | 82.5 | .5168 |
| tree or flower | 92.3 | 89.5 | .0227 |
| telephone or television | 88.5 | 84.2 | .1333 |
| man or boy | 82.7 | 87.7 | .2207 |
| mosquito or grasshopper | 59.6 | 70.2 | 1.3353 |
| fly or butterfly | 82.7 | 86.0 | .0425 |
| Slower? horse or dog | 55.8 | 61.4 | .3561 |
| car or bicycle | 69.2 | 77.2 | .8828 |
| train or rocket | 53.8 | 64.9 | 1.3833 |
| Heavier? butterfly or bird | 71.2 | 80.7 | 1.3648 |
| brick or shoe | 71.2 | 86.0 | 2.7486 |
| feather or fork | 71.2 | 78.9 | .8863 |
| Close your eyes | 96.2 | 94.7 | |
| Raise your hand | 98.1 | 98.2 | |
| Show me your teeth | 100 | 100 | |
| Show me your fingernails | 98.1 | 100 | |
| Wiggle | 76.9 | 71.9 | .3552 |
| Say "hello" very loudly. | 86.5 | 84.2 | .0052 |
| Say "hello" very softly. | 88.5 | 93.0 | .2348 |

(Table continued on next page)

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Stand up | 98.1 | 98.2 | |
| Turn around | 90.4 | 87.7 | .0190 |
| Face the door | 92.3 | 94.7 | .0158 |
| Jump | 96.2 | 98.2 | |
| Sit down | 94.2 | 98.2 | |
| Name all the things you can think of. (4+) | 23.1 | 22.8 | .0011 |
| What color is this? red | 67.3 | 70.2 | .1042 |
| yellow | 100 | 100 | |
| orange | 100 | 100 | |
| green | 63.5 | 70.2 | .5542 |
| blue | 61.5 | 68.4 | .5672 |
| purple | 44.2 | 63.2 | 3.9233* |
| brown | 67.3 | 80.7 | 2.5556 |
| black | 69.2 | 78.9 | 1.3449 |
| What color is fire? | 78.8 | 78.9 | .0002 |
| grass | 88.5 | 84.2 | .1333 |
| snow | 82.7 | 86.0 | .0425 |
| carrot | 69.2 | 87.7 | 4.5279* |
| the sky | 86.5 | 86.0 | .0367 |
| night | 82.7 | 86.0 | .0425 |
| Which way does a saw go? | 67.3 | 66.7 | .0051 |
| elevator | 88.5 | 91.2 | .0258 |
| ferris wheel | 69.2 | 84.2 | 2.6567 |
| phonograph record | 80.8 | 78.9 | .0560 |
| water fall | 80.8 | 84.2 | .0485 |
| When do we eat breakfast? | 44.2 | 52.6 | .7682 |
| What day do people go to church? | 40.4 | 54.4 | 2.1368 |
| What day is today? | 9.6 | 12.3 | .0190 |
| What's it like outside at bed time? | 78.8 | 75.4 | .1786 |
| Hottest time of year? | 25.0 | 19.3 | .5149 |
| Coldest time of year? | 19.2 | 21.1 | .0560 |
| What time of year is it now? | 17.3 | 15.8 | .0020 |
| If mother called up to talk, what would she use? | 80.8 | 82.5 | .0516 |
| Where would you find a lion? | 61.5 | 70.2 | .9047 |
| Where would you buy some gas? | 80.8 | 84.2 | .0485 |
| If sick, where would you go? | 78.8 | 71.9 | .6980 |
| Where would you find a boat? | 73.1 | 68.4 | .2842 |
| Where get something to read? | 69.2 | 64.9 | .2293 |
| What does a doctor do?[c] | 34.6 | 43.9 | .9728 |
| policeman | 9.6 | 5.3 | .2526 |
| dentist | 30.8 | 42.1 | 1.5042 |
| teacher | 44.2 | 54.4 | 1.1218 |
| father | 48.1 | 43.9 | .1948 |

(Table continued on next page)

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| nurse | 32.7 | 35.1 | .0696 |
| mother | 40.4 | 43.9 | .1346 |
| soldier | 15.4 | 22.8 | .5451 |
| Traces successfully? | 86.5 | 89.5 | .0311 |
| Draws: bird to wagon | 94.2 | 93.0 | |
| clock to cake | 80.8 | 86.0 | .2223 |
| dog to boy | 80.8 | 94.7 | 3.8083 |
| girl to ball | 88.5 | 94.7 | .7066 |
| bird to other bird | 75.0 | 87.7 | 2.1488 |

Note.--Figures are in terms of percent.

Note.--Responses to questions 124 through 134 and 149 through 161 are not tabled.

[a]N = 52.

[b]N = 57.

[c]Percentages are in terms of supportive responses.

*Significant at .05 level.

**Significant at .01 level.

Table 15

Chi Square Test of Items
From Preschool Inventory - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| What is your name? | 90.8 | 97.7 | 93.6 | |
| Last name? | 90.8 | 88.6 | 89.9 | .0015 |
| How old are you? | 81.5 | 88.6 | 84.4 | .5374 |
| When is your birthday? | 29.2 | 43.2 | 34.9 | 2.2489 |
| Where do you live? | 27.7 | 40.9 | 33.0 | 2.0721 |
| What school will you go to? | 32.3 | 59.1 | 43.1 | 7.6741** |
| What is your teacher's name? | 73.8 | 77.3 | 75.2 | .1653 |
| Names of children in group? (4+) | 43.1 | 54.5 | 47.7 | 1.3833 |
| Last names given (none) | 83.1 | 65.9 | 76.1 | 4.2577* |
| What is this? ear | 100 | 100 | 100 | |
| finger | 98.5 | 97.7 | 98.2 | |
| neck | 89.2 | 88.6 | 89.0 | .0460 |
| back | 89.2 | 97.7 | 92.7 | |
| eye | 95.4 | 100 | 97.2 | |
| elbow | 76.9 | 63.6 | 71.6 | 2.2760 |
| heel | 41.5 | 34.1 | 38.5 | .6145 |
| shoulder | 64.6 | 65.9 | 65.1 | .0193 |
| eyebrow | 67.7 | 61.4 | 65.1 | .4628 |
| knee | 75.4 | 68.2 | 72.5 | .6824 |
| How many eyes do you have? | 89.2 | 93.2 | 90.8 | .1317 |
| noses | 92.3 | 77.3 | 86.2 | 3.8112 |
| ears | 92.3 | 93.2 | 92.7 | .0410 |
| heads | 90.8 | 93.2 | 91.7 | .0089 |
| feet | 92.3 | 90.9 | 91.7 | .0089 |
| hands | 89.2 | 86.4 | 88.1 | .0231 |
| toes | 13.8 | 15.9 | 14.7 | .0005 |
| mouths | 89.2 | 81.8 | 86.2 | .6705 |
| necks | 87.7 | 86.4 | 87.2 | .0078 |
| "broken arms" | 66.2 | 65.9 | 66.1 | .0007 |
| How many wheels does a car have? | 60.0 | 47.7 | 55.0 | 1.5971 |
| bicycle | 76.9 | 84.1 | 79.8 | .4510 |
| tricycle | 58.5 | 63.6 | 60.6 | .2942 |
| wheelbarrow | 43.1 | 40.9 | 42.2 | .0506 |
| rowboat | 26.2 | 18.2 | 22.9 | .5463 |
| Counting | 84.6 | 95.5 | 89.0 | 2.1374 |
| Show me a corner | 72.3 | 63.6 | 68.8 | .9192 |
| How many corners does a sheet of paper have? | 55.4 | 59.1 | 56.9 | .1470 |
| Which has more? 2 & 8 | 87.7 | 86.4 | 87.2 | .0078 |
| 5 & 6 | 72.3 | 75.0 | 73.4 | .0974 |
| 6 & 6 | 20.0 | 27.3 | 22.9 | .7852 |

(Table continued on next page)

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Which group has fewer? 8 & 2 | 50.8 | 61.4 | 55.0 | 1.1901 |
| Give me the middle one. | 80.0 | 68.2 | 75.2 | 1.9666 |
| first | 69.2 | 65.9 | 67.9 | .1328 |
| last | 56.9 | 47.7 | 53.2 | .8912 |
| second | 35.4 | 40.9 | 37.6 | .3413 |
| next-to-last | 33.8 | 45.5 | 38.5 | 1.4928 |
| First car of train | 41.5 | 27.3 | 35.8 | 2.3239 |
| Last car on freight train | 23.1 | 20.5 | 22.0 | .0079 |
| What pulls the train? | 72.3 | 54.5 | 65.1 | 3.6454 |
| What do we call last car? | 53.8 | 52.3 | 53.2 | .0261 |
| What do we call this? circle | 43.1 | 50.0 | 45.9 | .5065 |
| line | 41.5 | 34.1 | 38.5 | .6145 |
| square | 27.7 | 27.3 | 27.5 | .0023 |
| triangle | 15.4 | 18.2 | 16.5 | .0151 |
| Drawings by child. line | 95.4 | 100 | 97.2 | |
| circle | 89.2 | 95.5 | 91.7 | |
| square | 56.9 | 75.0 | 64.2 | 3.7315 |
| triangle | 38.5 | 54.5 | 45.0 | 2.7430 |
| Which is more like a | | | | |
| wheel? | 92.3 | 90.9 | 91.7 | .0089 |
| window | 87.7 | 97.7 | 91.7 | 2.2891 |
| piece of string | 73.8 | 84.1 | 78.0 | 1.0627 |
| tent or teepee | 83.1 | 72.7 | 78.9 | 1.6882 |
| ice cream cone | 33.8 | 47.7 | 39.4 | 2.1166 |
| plate or dish | 67.7 | 70.5 | 68.8 | .0933 |
| stick | 89.2 | 90.9 | 89.9 | .0015 |
| Bigger? ball or bicycle | 81.5 | 77.3 | 79.8 | .2964 |
| tree or flower | 93.8 | 86.4 | 90.8 | .9794 |
| telephone or television | 84.6 | 88.6 | 86.2 | .0989 |
| man or boy | 86.2 | 84.1 | 85.3 | .0005 |
| mosquito or grasshopper | 69.2 | 59.1 | 65.1 | 1.1880 |
| fly or butterfly | 80.0 | 90.9 | 84.4 | 1.6158 |
| Slower? horse or dog | 60.0 | 56.8 | 58.7 | .1096 |
| car or bicycle | 73.8 | 72.7 | 73.4 | .0168 |
| train or rocket | 58.5 | 61.4 | 59.6 | .0918 |
| Heavier? butterfly or bird | 80.0 | 70.5 | 76.1 | 1.3162 |
| brick or shoe | 75.4 | 84.1 | 78.9 | .7289 |
| feather or fork | 75.4 | 75.0 | 75.2 | .0021 |
| Close your eyes | 92.3 | 100 | 95.4 | |
| Raise your hand | 98.5 | 97.7 | 98.2 | |
| Show me your teeth | 100 | 100 | 100 | |
| Show me your fingernails | 98.5 | 100 | 99.1 | |
| Wiggle | 76.9 | 70.5 | 74.3 | .5751 |
| Say "hello" very loudly. | 84.6 | 86.4 | 85.3 | .0005 |
| Say "hello" very softly. | 87.7 | 95.5 | 90.8 | |

(Table continued on next page)

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Stand up | 96.9 | 100 | 98.2 | |
| Turn around | 89.2 | 88.6 | 89.0 | .0460 |
| Face the door | 93.8 | 93.2 | 93.6 | .0673 |
| Jump | 95.4 | 100 | 97.2 | |
| Sit down | 93.8 | 100 | 96.3 | |
| Name all the things you can think of. (4+) | 15.4 | 34.1 | 22.9 | 5.1946* |
| What color is this? red | 76.9 | 56.8 | 68.8 | 4.9415* |
| yellow | 100 | 100 | 100 | |
| orange | 100 | 100 | 100 | |
| green | 72.3 | 59.1 | 67.0 | 2.0721 |
| blue | 73.8 | 52.3 | 65.1 | 5.3776* |
| purple | 63.1 | 40.9 | 54.1 | 5.1930* |
| brown | 80.0 | 65.9 | 74.3 | 2.7292 |
| black | 76.9 | 70.5 | 74.3 | .5751 |
| What color is fire? | 78.5 | 79.5 | 78.9 | .0106 |
| grass | 81.5 | 93.2 | 86.2 | 2.0965 |
| snow | 81.5 | 88.6 | 84.4 | .5374 |
| carrot | 80.0 | 77.3 | 78.9 | .1172 |
| the sky | 86.2 | 86.4 | 86.2 | .0636 |
| night | 83.1 | 86.4 | 84.4 | .0380 |
| Which way does a saw go? | 61.5 | 75.0 | 67.0 | 2.1496 |
| elevator | 90.8 | 88.6 | 89.9 | .0015 |
| ferris wheel | 78.5 | 75.0 | 77.1 | .1779 |
| phonograph record | 78.5 | 81.8 | 79.8 | .0343 |
| water fall | 81.5 | 84.1 | 82.6 | .0076 |
| When do we eat breakfast? | 56.9 | 36.4 | 48.6 | 4.4397* |
| What day do people go to church? | 44.6 | 52.3 | 47.7 | .6166 |
| What day is today? | 7.7 | 15.9 | 11.0 | 1.0667 |
| What's it like outside at bed time? | 78.5 | 75.0 | 77.1 | .1779 |
| Hottest time of year? | 20.0 | 25.0 | 22.0 | .3820 |
| Coldest time of year? | 21.5 | 18.2 | 20.2 | .0343 |
| What time of year is it now? | 21.5 | 9.1 | 16.5 | 2.1151 |
| If mother called up to talk, what would she use? | 81.5 | 81.8 | 81.7 | .0463 |
| Where would you find a lion? | 70.8 | 59.1 | 66.1 | 1.1771 |
| Where would you buy some gas? | 83.1 | 81.8 | 82.6 | .0076 |
| If sick, where would you go? | 78.5 | 70.5 | 75.2 | .9027 |
| Where would you find a boat? | 76.9 | 61.4 | 70.6 | 3.0629 |
| Where get something to read? | 70.8 | 61.4 | 67.0 | 1.0494 |
| What does a doctor do?[c] | 47.7 | 27.3 | 39.4 | 4.5801* |
| policeman | 10.8 | 2.3 | 7.3 | 1.6760 |
| dentist | 41.5 | 29.5 | 36.7 | 1.6246 |
| teacher | 55.4 | 40.9 | 49.5 | 2.1994 |
| father | 47.7 | 43.2 | 45.9 | .2150 |

(Table continued on next page)

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| nurse | 33.8 | 34.1 | 33.9 | .0007 |
| mother | 40.0 | 45.5 | 42.2 | .3200 |
| soldier | 24.6 | 11.4 | 19.3 | 2.1716 |
| Traces successfully? | 86.2 | 90.9 | 88.1 | .2028 |
| Draws: bird to wagon | 92.3 | 95.5 | 93.6 | |
| clock to cake | 84.6 | 81.8 | 83.5 | .0151 |
| dog to boy | 89.2 | 86.4 | 88.1 | .0231 |
| girl to ball | 92.3 | 90.9 | 91.7 | .0089 |
| bird to other bird | 83.1 | 79.5 | 81.7 | .0463 |

Note.--Figures are in terms of percent.

Note.--Responses to questions 124 through 134 and 149 through 161 are not tabled.

[a] N = 65.

[b] N = 44.

[c] Percentages are in terms of supportive responses.

*Significant at .05 level.

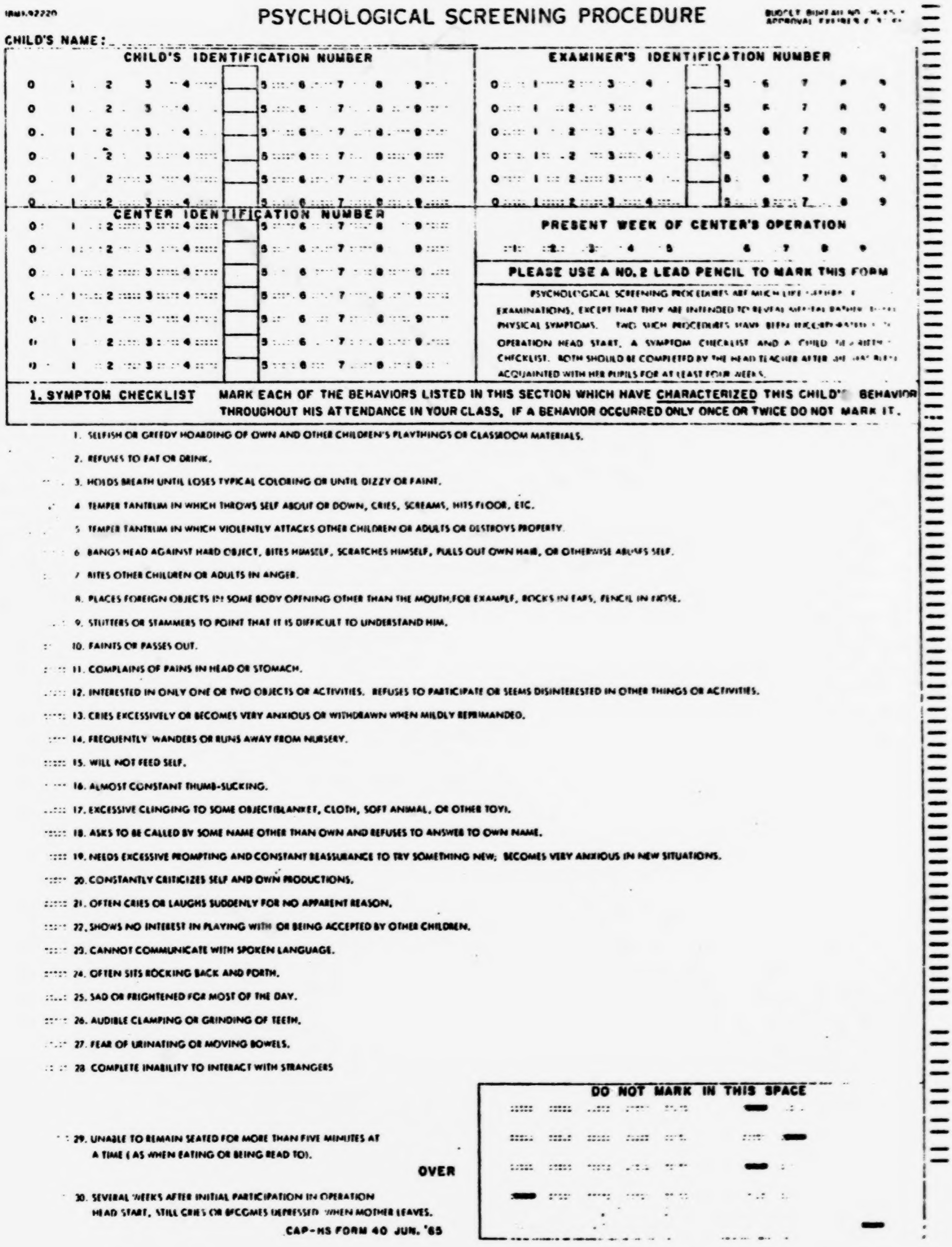
**Significant at .01 level.

# Appendix C

## Psychological Screening Procedure

Examination copy and chi square analysis
of performance by sex and race.

Figure 5



IBM1.92220

## PSYCHOLOGICAL SCREENING PROCEDURE

BUDGET BUREAU NO. [illegible]
APPROVAL EXPIRES [illegible]

CHILD'S NAME: ____________________

**CHILD'S IDENTIFICATION NUMBER**

0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9

**EXAMINER'S IDENTIFICATION NUMBER**

0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9

**CENTER IDENTIFICATION NUMBER**

0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9
0 1 2 3 4 ☐ 5 6 7 8 9

**PRESENT WEEK OF CENTER'S OPERATION**

1 2 3 4 5 6 7 8 9

**PLEASE USE A NO. 2 LEAD PENCIL TO MARK THIS FORM**

PSYCHOLOGICAL SCREENING PROCEDURES ARE MUCH LIKE [illegible] EXAMINATIONS, EXCEPT THAT THEY ARE INTENDED TO REVEAL MENTAL RATHER THAN PHYSICAL SYMPTOMS. TWO SUCH PROCEDURES HAVE BEEN INCORPORATED INTO OPERATION HEAD START, A SYMPTOM CHECKLIST AND A CHILD [illegible] CHECKLIST. BOTH SHOULD BE COMPLETED BY THE HEAD TEACHER AFTER SHE HAS BEEN ACQUAINTED WITH HER PUPILS FOR AT LEAST FOUR WEEKS.

**1. SYMPTOM CHECKLIST** MARK EACH OF THE BEHAVIORS LISTED IN THIS SECTION WHICH HAVE CHARACTERIZED THIS CHILD'S BEHAVIOR THROUGHOUT HIS ATTENDANCE IN YOUR CLASS. IF A BEHAVIOR OCCURRED ONLY ONCE OR TWICE DO NOT MARK IT.

1. SELFISH OR GREEDY HOARDING OF OWN AND OTHER CHILDREN'S PLAYTHINGS OR CLASSROOM MATERIALS.
2. REFUSES TO EAT OR DRINK.
3. HOLDS BREATH UNTIL LOSES TYPICAL COLORING OR UNTIL DIZZY OR FAINT.
4. TEMPER TANTRUM IN WHICH THROWS SELF ABOUT OR DOWN, CRIES, SCREAMS, HITS FLOOR, ETC.
5. TEMPER TANTRUM IN WHICH VIOLENTLY ATTACKS OTHER CHILDREN OR ADULTS OR DESTROYS PROPERTY.
6. BANGS HEAD AGAINST HARD OBJECT, BITES HIMSELF, SCRATCHES HIMSELF, PULLS OUT OWN HAIR, OR OTHERWISE ABUSES SELF.
7. BITES OTHER CHILDREN OR ADULTS IN ANGER.
8. PLACES FOREIGN OBJECTS IN SOME BODY OPENING OTHER THAN THE MOUTH,FOR EXAMPLE, ROCKS IN EARS, PENCIL IN NOSE.
9. STUTTERS OR STAMMERS TO POINT THAT IT IS DIFFICULT TO UNDERSTAND HIM.
10. FAINTS OR PASSES OUT.
11. COMPLAINS OF PAINS IN HEAD OR STOMACH.
12. INTERESTED IN ONLY ONE OR TWO OBJECTS OR ACTIVITIES. REFUSES TO PARTICIPATE OR SEEMS DISINTERESTED IN OTHER THINGS OR ACTIVITIES.
13. CRIES EXCESSIVELY OR BECOMES VERY ANXIOUS OR WITHDRAWN WHEN MILDLY REPRIMANDED.
14. FREQUENTLY WANDERS OR RUNS AWAY FROM NURSERY.
15. WILL NOT FEED SELF.
16. ALMOST CONSTANT THUMB-SUCKING.
17. EXCESSIVE CLINGING TO SOME OBJECT(BLANKET, CLOTH, SOFT ANIMAL, OR OTHER TOY).
18. ASKS TO BE CALLED BY SOME NAME OTHER THAN OWN AND REFUSES TO ANSWER TO OWN NAME.
19. NEEDS EXCESSIVE PROMPTING AND CONSTANT REASSURANCE TO TRY SOMETHING NEW; BECOMES VERY ANXIOUS IN NEW SITUATIONS.
20. CONSTANTLY CRITICIZES SELF AND OWN PRODUCTIONS.
21. OFTEN CRIES OR LAUGHS SUDDENLY FOR NO APPARENT REASON.
22. SHOWS NO INTEREST IN PLAYING WITH OR BEING ACCEPTED BY OTHER CHILDREN.
23. CANNOT COMMUNICATE WITH SPOKEN LANGUAGE.
24. OFTEN SITS ROCKING BACK AND FORTH.
25. SAD OR FRIGHTENED FOR MOST OF THE DAY.
26. AUDIBLE CLAMPING OR GRINDING OF TEETH.
27. FEAR OF URINATING OR MOVING BOWELS.
28. COMPLETE INABILITY TO INTERACT WITH STRANGERS
29. UNABLE TO REMAIN SEATED FOR MORE THAN FIVE MINUTES AT A TIME (AS WHEN EATING OR BEING READ TO).
30. SEVERAL WEEKS AFTER INITIAL PARTICIPATION IN OPERATION HEAD START, STILL CRIES OR BECOMES DEPRESSED WHEN MOTHER LEAVES.

**DO NOT MARK IN THIS SPACE**

**OVER**

CAP-HS FORM 40 JUN. '65

(RUN92771

# PSYCHOLOGICAL SCREENING PROCEDURE

**II. CHILD DESCRIPTION CHECKLIST** READ EACH DESCRIPTION CAREFULLY AND PUT A MARK BESIDE ANY THAT FIT THIS CHILD REASONABLY WELL. IT IS RECOGNIZED THAT DESCRIPTIONS OF THIS SORT DO NOT DO JUSTICE TO THE WHOLE CHILD AND THAT NO CHILD WILL FIT ANY DESCRIPTION EXACTLY. JUST PLACE A MARK BESIDE THE DESCRIPTIONS THAT FIT THIS CHILD REASONABLY WELL. THESE DESCRIPTIONS ARE NOT MUTUALLY EXCLUSIVE. IT IS POSSIBLE THAT SOME CHILDREN WILL FIT TWO OR MORE OF THEM. ALSO, THERE WILL BE MANY CHILDREN WHO DO NOT FIT ANY OF THESE DESCRIPTIONS. IT IS POSSIBLE THAT IN SOME CLASSES THERE WILL BE NO CHILD TO FIT ANY OF THE DESCRIPTIONS. FEW PROFESSIONAL PEOPLE, NO MATTER HOW WELL TRAINED, CAN MAKE THIS KIND OF RATING WITH ABSOLUTE CERTAINTY AND COMPLETE COMFORT. DON'T SPEND TOO MUCH TIME WORRYING WHETHER A PARTICULAR CHILD REALLY DOES OR DOESN'T FIT THE DESCRIPTIONS. MAKE YOUR BEST JUDGEMENT FOR EACH CHILD ON EACH DESCRIPTION AND THEN GO ON TO THE NEXT.

1. THE DISRUPTIVE CHILD THE DISRUPTIVE CHILD IS ONE WHO DISTURBS THE ACTIVITIES AND PLAY OF OTHER CHILDREN. HE MAY DO THIS BY PUSHING OR TEASING CHILDREN WHO ARE ENGAGED IN ACTIVITIES OR BY SNATCHING OR OTHERWISE DISTURBING THE MATERIALS WITH WHICH OTHER CHILDREN ARE PLAYING.

2. THE PROVOCATIVE CHILD THE PROVOCATIVE CHILD IS ONE WHO DELIBERATELY TRIES TO IRRITATE THE TEACHER. HE ATTEMPTS TO SECURE THE TEACHER'S ATTENTION BY DOING THINGS WHICH ARE PROHIBITED OR WHICH HE SHOULD KNOW THAT THE TEACHER DISLIKES. HE MAY REFUSE TO GO ALONG WITH GROUP ACTIVITIES, HE MAY CURSE OR OTHERWISE INSULT THE TEACHER, HE MAY DAMAGE OR DESTROY CLASSROOM MATERIALS, ETC. THIS CHILD DOES NOT RESPOND TO PUNISHMENTS BY "BEING BETTER."

3. THE ISOLATED CHILD THE ISOLATED CHILD NEVER SEEMS TO PLAY WITH OTHER PUPILS. HE DOESN'T SEEM TO BE ABLE TO INITIATE CONTACT WITH OTHER CHILDREN, THEY SEEM TO IGNORE HIM AND HE THEM. OTHER CHILDREN DO NOT INCLUDE HIM IN GROUP ACTIVITIES AND HE DOES NOT SEEM TO CARE.

4. THE FEARFUL OR TEARFUL CHILD THE FEARFUL CHILD IS EXCESSIVELY TIMID. HE CRIES MORE OFTEN THAN THE OTHER CHILDREN. OFTEN HE CRIES FOR NO APPARENT REASON. HE SEEMS TO WANT TO PLAY WITH OTHER CHILDREN AND DO THE THINGS WHICH ARE "FUN", BUT HIS FEARFULNESS GETS IN THE WAY. HE MAY BE SOMETHING OF A "TATTLE TALE," A "WHINER," OR A "MOTHER'S BOY (GIRL)."

5. THE SILENT CHILD THE SILENT CHILD NEVER TALKS. HE WILL USE GESTURES OR SIGNS RATHER THAN WORDS. HE SEEMS TO UNDERSTAND WHAT OTHER PEOPLE SAY, BUT HE WON'T RESPOND VERBALLY UNLESS REALLY URGED.

6. THE CHILD WHO DOESN'T LEARN THE CHILD WHO DOESN'T LEARN NEVER SEEMS TO GET ANY BETTER AT WHAT HE IS BEING TAUGHT. HE MAY TRY HARD, BUT HE DOESN'T SEEM TO IMPROVE. HE MAY HAVE DIFFICULTY UNDERSTANDING WHAT HE IS TOLD, AND MAY HAVE TO HAVE THINGS REPEATED A NUMBER OF TIMES. HE DOESN'T SEEM TO BE AS QUICK OR ALERT AS THE OTHER CHILDREN. OFTEN, HE SEEMS IMMATURE FOR HIS AGE.

7. THE CHILD WITH SEPARATION PROBLEMS THE CHILD WITH SEPARATION PROBLEMS SEEMS TO GET ALONG WELL MOST OF THE TIME, BUT HE HAS GREAT DIFFICULTY EARLY IN THE SCHOOL DAY. HIS DIFFICULTIES MAY BE MOST MARKED DURING THE FIRST DAYS OF NURSERY SCHOOL AND AFTER WEEKENDS OR VACATIONS. EARLY IN THE DAY, HE MAY SAY THAT HE DOESN'T WANT TO LEAVE HIS MOTHER OR THAT HE WANTS TO GO HOME TO HIS MOTHER. LATER ON, HE SETTLES DOWN AND SEEMS TO DO FINE. THIS CHILD'S MOTHER MAY COME TO THE CLASSROOM WITH THE CHILD MORE FREQUENTLY THAN OTHERS MOTHERS AND MAY TALK TO THE TEACHER QUITE OFTEN ABOUT HOW DIFFICULT THINGS ARE FOR HER CHILD.

8. THE UNHAPPY CHILD THE UNHAPPY CHILD IS ALWAYS "DOWN-AT-THE-MOUTH." HE DOESN'T SMILE VERY OFTEN AND SEEMS TO LACK A "JOY FOR LIFE." HE MIGHT NOT CRY VERY OFTEN, BUT HE DOESN'T APPEAR TO ENJOY HIMSELF OR THE THINGS THAT ARE GOING ON AROUND HIM.

9. THE HYPERACTIVE CHILD THIS IS A CHILD WHO JUST CAN'T SIT STILL. HE MAY ROAM AIMLESSLY ABOUT THE ROOM. IF HE IS DISRUPTIVE OF OTHER CHILDREN'S ACTIVITIES IT IS MORE AN ACCIDENTAL RESULT OF HIS RUNNING ABOUT, THAN A DELIBERATE AGGRESSIVENESS. SOME HYPERACTIVE CHILDREN DON'T ROAM AROUND A GREAT DEAL. RATHER, THEY OCCUPY THEMSELVES WITH STRANGE MOTOR ACTIVITIES SUCH AS SHAKING THEIR HANDS OR WAVING THEIR FINGERS BEFORE THEIR EYES, PULLING AT THEIR EARS OR OTHER BODY PARTS, ROCKING BACK AND FORTH. THIS TYPE OF CHILD IS OFTEN EXTREMELY DISTRACTIBLE.

**III. REFERRAL OR TREATMENT REPORT** ON THE BASIS OF THE BEHAVIORS NOTED ABOVE OR ANY OTHER FACTORS, WAS THIS CHILD REFERRED TO, TREATED AT, OR PLACED INTO ANY OF THE FOLLOWING:

| | YES | NO | | YES | NO |
|---|---|---|---|---|---|
| 1. CHILD GUIDANCE CLINIC | ☐ | ☐ | 8. HOME FOR DEPENDENT CHILDREN | ☐ | ☐ |
| 2. MENTAL HEALTH CENTER | ☐ | ☐ | 9. OTHER (SEE BELOW) | ☐ | |
| 3. PUBLIC HEALTH NURSE OR PHYSICIAN | ☐ | ☐ | 10. IF REFERRAL WAS MADE, WAS THE CHILD DIAGNOSED AS ABNORMAL? | ☐ | ☐ |
| 4. HOSPITAL OR MEDICAL CLINIC | ☐ | ☐ | 11. IF REFERRAL WAS MADE, WAS TREATMENT INITIATED? | ☐ | ☐ |
| 5. STATE SCHOOL FOR THE MENTALLY RETARDED | ☐ | ☐ | | | |
| 6. HOSPITAL FOR THE EMOTIONALLY DISTURBED | ☐ | ☐ | | | |
| 7. FOSTER HOME | ☐ | ☐ | | | |

DO NOT MARK IN THIS SPACE

PLEASE SPECIFY "OTHER", REFERRAL OR TREATMENT

Table 16

Chi Square Test of Items
From Psychological Screening Procedure - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Refuses to eat or drink | 5.5 | 9.6 | 2.0670 |
| Holds breath | 0 | 0 | |
| Temper tantrum - self | 5.5 | 3.6 | .3791 |
| Temper tantrum - others | 5.5 | 1.2 | |
| Bangs head - bites self | 0 | 0 | |
| Bites other children | 2.8 | .6 | |
| Places foreign objects | 0 | 0 | |
| Stutters or stammers | 6.1 | 2.4 | 2.0323 |
| Faints | 0 | 0 | |
| Complains of pains | 2.2 | 4.2 | .5458 |
| Interested in only 1 or 2 objects | 11.0 | 13.1 | .3444 |
| Cries excessively | 3.9 | 8.3 | 2.3339 |
| Frequently wanders or runs away | 4.4 | 3.6 | .0171 |
| Will not feed self | .6 | 1.8 | |
| Almost constant thumb-sucking | 1.7 | 7.7 | 6.0401* |
| Excessive clinging to some object | 2.2 | 3.6 | .1942 |
| Asks to be called by other name | .6 | 0 | |
| Needs excessive prompting | 18.8 | 20.8 | .2306 |
| Constantly criticizes self | 0 | .6 | |
| Cries or laughs suddenly | | | |
| Shows no interest in playing with or being accepted by others | 9.9 | 11.3 | .1712 |
| Cannot communicate | 3.9 | 8.9 | 2.9704 |
| Often sits rocking back & forth | 1.7 | 1.2 | |
| Sad or frightened most of day | 1.7 | 6.0 | 3.3641 |
| Audible clamping of teeth | 0 | 0 | |
| Fear of urinating | 1.1 | .6 | |
| Complete inability to interact with strangers | 1.7 | 5.4 | 2.5641 |
| Unable to remain seated | 19.3 | 10.1 | 5.8388* |
| Cries or becomes depressed | 1.1 | 1.2 | |
| The disruptive child | 24.6 | 10.8 | 11.0262** |
| The provocative child | 13.8 | 6.5 | 4.9703* |
| The isolated child | 7.7 | 11.3 | 1.3005 |
| The fearful or tearful child | 4.4 | 6.5 | .4087 |
| The silent child | 6.6 | 10.7 | 1.8500 |
| The child who doesn't learn | 4.4 | 5.4 | .0248 |
| The child with separation problems | 2.8 | 3.6 | .0158 |
| The unhappy child | 3.3 | 12.5 | 9.0516** |
| The hyperactive child | 13.3 | 6.5 | 4.4232* |

Note.—Figures are in terms of percent.

[a] N = 181.

[b] N = 168.

*Significant at .05 level.

**Significant at .01 level.

Table 17

Chi Square Test of Items
From Psychological Screening Procedure - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Refuses to eat or drink | 8.7 | 5.7 | 7.5 | .6639 |
| Holds breath | 0 | 0 | 0 | |
| Temper tantrum - self | 5.7 | 2.9 | 4.6 | 1.0030 |
| Temper tantrum - others | 4.3 | 2.1 | 3.4 | .6200 |
| Bangs head - bites self | 0 | 0 | 0 | |
| Bites other children | 1.9 | 1.4 | 1.7 | |
| Places foreign objects | 0 | 0 | 0 | |
| Stutters or stammers | 6.7 | .7 | 4.3 | 5.9575* |
| Faints | 0 | 0 | 0 | |
| Complains of pains | 3.3 | 2.9 | 3.2 | .0030 |
| Interested in only 1 or 2 objects | 14.8 | 7.9 | 12.0 | 3.8534* |
| Cries excessively | 4.3 | 8.6 | 6.0 | 1.9955 |
| Frequently wanders or runs away | 4.8 | 2.9 | 4.0 | .3858 |
| Will not feed self | 1.9 | 0 | 1.1 | |
| Almost constant thumb-sucking | 3.8 | 5.7 | 4.6 | .3190 |
| Excessive clinging to some object | 4.3 | .7 | 2.9 | |
| Asks to be called by other name | 0 | .7 | .3 | |
| Needs excessive prompting | 21.5 | 17.1 | 19.8 | 1.0178 |
| Constantly criticizes self | .5 | 0 | .3 | |
| Cries or laughs suddenly | 1.9 | 3.6 | 2.6 | .3758 |
| Shows no interest in playing with or being accepted by others | 10.0 | 11.4 | 10.6 | .1686 |
| Cannot communicate | 6.2 | 6.4 | 6.3 | .0214 |
| Often sits rocking back & forth | 1.0 | 2.1 | 1.4 | |
| Sad or frightened most of day | 3.3 | 4.3 | 3.7 | .0270 |
| Audible clamping of teeth | 0 | 0 | 0 | |
| Fear of urinating | .5 | 1.4 | .9 | |
| Complete inability to interact with strangers | 1.4 | 6.4 | 3.4 | 4.8816* |
| Unable to remain seated | 13.9 | 16.4 | 14.9 | .4310 |
| Cries or becomes depressed | 1.4 | .7 | 1.1 | |
| The disruptive child | 16.3 | 20.4 | 18.0 | .9381 |
| The provocative child | 8.1 | 13.6 | 10.3 | 2.6794 |
| The isolated child | 9.1 | 10.0 | 9.5 | .0809 |
| The fearful or tearful child | 7.2 | 2.9 | 5.4 | 2.2581 |
| The silent child | 7.2 | 10.7 | 8.6 | 1.3351 |
| The child who doesn't learn | 3.3 | 7.1 | 4.9 | 1.8495 |
| The child with separation problems | 4.8 | .7 | 3.2 | |
| The unhappy child | 8.6 | 6.4 | 7.7 | .2960 |
| The hyperactive child | 9.6 | 10.8 | 10.1 | .1378 |

Note.--Figures are in terms of percent.
[a] N = 209.
[b] N = 140.
*Significant at .05 level.

# Appendix D

## Mental Developmental Chart

**Examination copy, scoring criteria, and chi square analysis of performance by sex and race.**

Figure 6

**MENTAL DEVELOPMENTAL CHART**

Date ____________

Examiner ____________

| NAME | ACTIVITY |  |  |  |  |  |  |  |  |  |  |  |  |  |  | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Remove Object | Nursery Rhyme | Sings Song | 6 - 2 - 7 - 9 | Left - Right | Big - Little | Counts 4 Objects | Rote Counts | Names Colors | Shows Colors | 3 Animals | 3 Fruit | Characteristics | Sequence | Cat - Mouse |  |
| 1. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 18. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 19. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

## Figure 7

## Scoring Criteria for Use with Mental Developmental Chart

Remove Object - place a dog, block, doll and ball on table. Allow child to look while you call attention to each item by name. Remove one object after the child has closed his eyes. After allowing child to open his eyes ask, "Which one is missing?"

Nursery Rhyme - recites a nursery rhyme from memory.

Sings Song - sings a song from memory.

6 - 2 - 7 - 9 - repeat 4 digits forward after given by examiner. Say, "Listen carefully and say exactly what I say."

Left - Right - ask child to "show me your left ear; right leg; right eye." (2-3)

Big - Little - child asked to "show me a big block"; "a little block." (have six blocks on table; 4 big and 2 small)

Counts 4 Objects - ask, "Count the blocks for me."

Rote Counts - ask, "Count as far as you can."

Names Colors - have a red, green, yellow and blue block. Ask while pointing, "What color is this?"

Shows Colors - have a red, green, yellow and blue block. Ask, "show me the red block," "the green block," etc.

Three Animals - ask, "Name 3 animals for me."

Three Fruit - ask, "Name 3 fruit for me."

Characteristics - "Tell me as many things as you can about a jet airplane." (must name 3 characteristics to pass item)

Sequence - ask, "Put these together so they tell a story." (arrange in 3, 1, 2 order before child starts)

Cat - Mouse - "In what way are a cat and a mouse alike?" (one correct to pass. If they say both are animals score ++)

## Table 18

### Chi Square Test of Items From Mental Developmental Chart - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Removes object | 74.7 | 76.8 | .1826 |
| Nursery rhyme | 31.8 | 41.2 | 3.0697 |
| Sings song | 50.6 | 59.3 | 2.4932 |
| 6 - 2 - 7 - 9 | 58.0 | 63.3 | .9423 |
| Left - right | 40.8 | 37.3 | .4073 |
| Big - little | 88.4 | 90.0 | .1867 |
| Counts 4 objects | 75.3 | 83.2 | 3.0401 |
| Rote counts | 60.3 | 70.0 | 3.2929 |
| Names colors | 45.4 | 68.7 | 17.7096** |
| Shows colors | 59.0 | 76.7 | 11.4254** |
| 3 animals | 66.1 | 79.3 | 7.0403** |
| 3 fruit | 51.7 | 58.7 | 1.5684 |
| Characteristics | 41.1 | 33.1 | 2.0437 |
| Sequence | 40.3 | 50.8 | 3.1774 |
| Cat - mouse | 32.9 | 32.4 | .0115 |

Note.—Figures are in terms of percent passing.
[a] Max. N = 174.
[b] Max. N = 155.
**Significant at .01 level.

### Table 19

### Chi Square Test of Items
### From Mental Developmental Chart - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Removes object | 75.9 | 75.4 | 75.7 | .0092 |
| Nursery rhyme | 38.3 | 33.1 | 36.2 | .9180 |
| Sings song | 51.8 | 58.6 | 54.6 | 1.4688 |
| 6 - 2 - 7 - 9 | 58.1 | 63.9 | 60.5 | 1.1016 |
| Left - right | 38.7 | 39.8 | 39.2 | .0403 |
| Big - little | 89.0 | 89.5 | 89.2 | .0179 |
| Counts 4 objects | 82.1 | 74.4 | 79.0 | 2.7686 |
| Rote counts | 65.4 | 63.9 | 64.8 | .0810 |
| Names colors | 59.2 | 51.9 | 56.2 | 1.6891 |
| Shows colors | 68.4 | 65.4 | 67.2 | .3210 |
| 3 animals | 77.0 | 65.4 | 72.2 | 5.2134* |
| 3 fruit | 55.5 | 54.1 | 54.9 | .0588 |
| Characteristics | 34.9 | 40.9 | 37.5 | 1.1569 |
| Sequence | 48.1 | 41.2 | 44.9 | 1.3524 |
| Cat - mouse | 35.5 | 29.0 | 32.7 | 1.4096 |

Note.--Figures are in terms of percent passing.

[a] Max. N = 196.

[b] Max. N = 133.

*Significant at .05 level.

# Appendix E

## Perceptual Developmental Chart

Examination copy, scoring criteria, and chi square analysis of performance by sex and race.

Figure 8

**PERCEPTUAL DEVELOPMENTAL CHART**

NAME

| | ACTIVITY | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VISION | Foreground | | | | | | | | | | | | | | | | | | | | |
| | Background | | | | | | | | | | | | | | | | | | | | |
| | Similarities | | | | | | | | | | | | | | | | | | | | |
| | Differences | | | | | | | | | | | | | | | | | | | | |
| HEARING | Bell | | | | | | | | | | | | | | | | | | | | |
| | Hand Clap | | | | | | | | | | | | | | | | | | | | |
| | High - Low | | | | | | | | | | | | | | | | | | | | |
| | Loud - Soft | | | | | | | | | | | | | | | | | | | | |
| TOUCH | Sandpaper | | | | | | | | | | | | | | | | | | | | |
| | Pencil | | | | | | | | | | | | | | | | | | | | |
| | Sand - Sand | | | | | | | | | | | | | | | | | | | | |
| | Sand - Salt | | | | | | | | | | | | | | | | | | | | |
| TASTE | Marshmallow | | | | | | | | | | | | | | | | | | | | |
| | Lemon | | | | | | | | | | | | | | | | | | | | |
| | Soda - Soda | | | | | | | | | | | | | | | | | | | | |
| | Soda - Graham | | | | | | | | | | | | | | | | | | | | |
| SMELL | Soap | | | | | | | | | | | | | | | | | | | | |
| | Paste | | | | | | | | | | | | | | | | | | | | |
| | Apple - Apple | | | | | | | | | | | | | | | | | | | | |
| | Apple - Orange | | | | | | | | | | | | | | | | | | | | |

Date

Examiner

## Figure 9

## Scoring Criteria for Use with Perceptual Developmental Chart

### Vision (child is shown a picture)

Foreground - responds to foreground first when asked to "tell me what you see in the picture."
Background - describes elements of the background when asked to "tell me some more about the picture."
Similarities - can tell at least one way in which the animals in the picture are alike.
Differences - can tell at least one way in which the animals in the picture are different.

### Hearing (child must not see any of the activities performed by the examiner)

Bell - identifies the sound as that of a bell. Ask, "What does this sound like?"
Hand Clap - identifies the sound as that of a hand clap.
High - Low - properly recognizes the high and low notes when played on the piano. Ask for each note, "Is this a high note?" (must correctly identify 2 of 3 to pass item)
Loud - Soft - properly recognizes a loud and soft note when played on the piano. Ask for each note, "Is this a loud note?" (2 of 3)

### Touch (child only allowed to use touch as a means of identification)

Sandpaper - identifies the sample as being sandpaper or by an appropriate quality (rough, jagged, etc.)
Pencil - identifies the sample as being a pencil.
Sand - Sand - after allowing child to feel two samples of sand ask, "Are they alike?" or "Are they the same?"
Sand - Salt - after allowing child to feel one sample of sand and one sample of salt ask, "Are they alike?

### Taste (child only allowed to use taste as a means of identification)

Marshmallow - identifies the small marshmallow given to eat by name or as being sweet. Ask, "What is it?" or "What does it taste like?"
Lemon - identifies the small bit of lemon given to taste by name or as being sour.
Soda - Soda - after allowing the child to eat two bits of soda crackers ask, "Are they alike?" or "Are they the same?"
Soda - Graham - after allowing the child to taste one sample of soda cracker and one sample of graham cracker ask, "Are they alike?" Caution: Don't break the crackers while the children are present.

### Smell (child is allowed only smell as a means of identification)

Soap - identifies smell of the object as soap. Ask, "What does this smell like?"
Paste - identifies smell of the object as paste.
Apple - Apple - after allowing child to smell two pieces of apple ask, "Are they alike?" or "Are they the same?"
Apple - Orange - after allowing child to smell one piece of apple and one piece of orange ask, "Are they alike?"

Table 20

Chi Square Test of Items
From Perceptual Developmental Chart - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Foreground | 94.2 | 87.9 | 3.9378* |
| Background | 67.4 | 64.7 | .2756 |
| Similarities | 57.6 | 45.3 | 4.7964* |
| Differences | 43.0 | 32.7 | 3.6404 |
| Bell | 84.8 | 81.3 | .6844 |
| Hand - clap | 72.5 | 74.0 | .0899 |
| High - low | 32.9 | 37.6 | .7512 |
| Loud - soft | 60.0 | 68.7 | 2.5998 |
| Sandpaper | 45.0 | 43.3 | .0864 |
| Pencil | 81.1 | 82.7 | .1370 |
| Sand - sand | 71.0 | 68.7 | .2067 |
| Sand - salt | 37.3 | 35.3 | .1299 |
| Marshmallow | 63.7 | 68.5 | .7985 |
| Lemon | 50.0 | 45.3 | .7055 |
| Soda - soda | 78.6 | 72.0 | 1.8486 |
| Soda - graham | 60.1 | 59.3 | .0203 |
| Soap | 65.5 | 64.7 | .0229 |
| Paste | 25.6 | 33.1 | 2.0693 |
| Apple - apple | 65.5 | 62.7 | .2720 |
| Apple - orange | 54.8 | 61.3 | 1.3718 |

Note.--Figures are in terms of percent passing.
[a] Max. N = 174.
[b] Max. N = 156.
*Significant at .05 level.

Table 21

Chi Square Test of Items
From Perceptual Developmental Chart - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Foreground | 92.1 | 90.2 | 91.3 | .3568 |
| Background | 64.0 | 69.2 | 66.1 | .9253 |
| Similarities | 50.3 | 54.1 | 51.9 | .4685 |
| Differences | 34.9 | 42.9 | 38.2 | 2.0829 |
| Bell | 75.0 | 94.7 | 83.2 | 21.6853** |
| Hand clap | 68.1 | 80.5 | 73.2 | 6.0731* |
| High - low | 31.6 | 40.2 | 35.1 | 2.5124 |
| Loud - soft | 64.9 | 62.9 | 64.1 | .1367 |
| Sandpaper | 44.1 | 44.4 | 44.2 | .0024 |
| Pencil | 76.9 | 88.7 | 81.8 | 7.3080** |
| Sand - sand | 66.1 | 75.2 | 69.9 | 3.0251 |
| Sand - salt | 33.9 | 39.8 | 36.4 | 1.1979 |
| Marshmallow | 69.2 | 61.4 | 65.9 | 2.1002 |
| Lemon | 41.5 | 56.4 | 47.8 | 6.8174** |
| Soda - soda | 70.3 | 82.7 | 75.5 | 6.4646* |
| Soda - graham | 51.9 | 70.7 | 59.7 | 11.3527** |
| Soap | 55.7 | 78.2 | 65.1 | 17.2698** |
| Paste | 24.9 | 34.6 | 29.1 | 3.4521 |
| Apple - apple | 56.8 | 74.4 | 64.2 | 10.5159** |
| Apple - orange | 51.6 | 66.7 | 57.9 | 7.1294** |

Note.--Figures are in terms of percent passing.

[a] Max. N = 197.

[b] Max. N = 133.

*Significant at .05 level.

**Significant at .01 level.

# Appendix F

## Physical Developmental Chart

Examination copy, scoring criteria, and chi square analysis of performance by sex and race.

Figure 10

**PHYSICAL**

**DEVELOPMENTAL**

**CHART**

________________
Date

________________
Examiner

| | ACTIVITY | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | Forward | Backward | Middle Jump | Jungle Gym | Hand Bar | Hops on one Foot | Stomach Roll | Somersault | Claps to Rhythm | Push-Pull Activity | Marches to Rhythm | Res. to Rest Period | Carries Liquid | Cuts with Scissors | Catches Bounced Ball | COMMENTS |
| 1. | | | | | | | | | | | | | | | | |
| 2. | | | | | | | | | | | | | | | | |
| 3. | | | | | | | | | | | | | | | | |
| 4. | | | | | | | | | | | | | | | | |
| 5. | | | | | | | | | | | | | | | | |
| 6. | | | | | | | | | | | | | | | | |
| 7. | | | | | | | | | | | | | | | | |
| 8. | | | | | | | | | | | | | | | | |
| 9. | | | | | | | | | | | | | | | | |
| 10. | | | | | | | | | | | | | | | | |
| 11. | | | | | | | | | | | | | | | | |
| 12. | | | | | | | | | | | | | | | | |
| 13. | | | | | | | | | | | | | | | | |
| 14. | | | | | | | | | | | | | | | | |
| 15. | | | | | | | | | | | | | | | | |
| 16. | | | | | | | | | | | | | | | | |
| 17. | | | | | | | | | | | | | | | | |
| 18. | | | | | | | | | | | | | | | | |
| 19. | | | | | | | | | | | | | | | | |
| 20. | | | | | | | | | | | | | | | | |

## Figure 11

### Scoring Criteria for Use with Physical Developmental Chart

Forward - walks forward on jump board without falling.
Backward - walks backward on jump board without falling.
Middle Jump - jumps while standing in the middle of the jump board without falling.

Jungle Gym - climbs until hands touch the top bar on the jungle gym.
Hand Bar - independently progresses one bar on hand bar.
Hops on one Foot - hops ten times on one foot. (record foot used)
Stomach Roll - successfully performs the stomach roll.
Somersault - successfully performs a forward somersault without assistance.

Claps to Rhythm - claps hands to the rhythm of music.
Marches to Rhythm - marches stamping feet to the rhythm of music.
Push-Pull Activity - similates appropriate action necessary for rowing a boat.

Response to Rest Period - demonstrates ability to relax during provided periods.
Carries Liquid - carries a glass of liquid short distance without spilling.
Cuts with Scissors - demonstrates motor coordination necessary to cut with scissors.
Catches Bounced Ball - catches medium sized ball when bounced from distance of 5 ft.

Table 22

Chi Square Test of Items
From Physical Developmental Chart - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Forward | 96.2 | 96.6 | .0384 |
| Backward | 82.0 | 82.1 | .0004 |
| Middle - jump | 81.2 | 81.7 | .0117 |
| Jungle gym | 78.6 | 72.4 | 1.7006 |
| Hand bar | 56.4 | 45.8 | 1.8931 |
| Hops on one foot | 69.2 | 79.4 | 4.4834* |
| Stomach roll | 47.9 | 38.4 | 2.8463 |
| Somersault | 68.1 | 65.1 | .3115 |
| Claps to rhythm | 70.3 | 77.8 | 2.3902 |
| Push-pull activity | 67.4 | 77.0 | 3.7892 |
| Marches to rhythm | 61.5 | 67.4 | 1.1406 |
| Response to rest period | 66.7 | 73.6 | 1.8925 |
| Carries liquid | 77.6 | 93.1 | 15.8111** |
| Cuts with scissors | 69.2 | 84.1 | 9.9429** |
| Catches bounced ball | 76.4 | 76.5 | .0005 |

Note.—Figures are in terms of percent passing.

[a] Max. N = 176.

[b] Max. N = 164.

*Significant at .05 level.

**Significant at .01 level.

Table 23

Chi Square Test of Items
From Physical Developmental Chart - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Forward | 97.8 | 94.6 | 96.4 | 1.0561 |
| Backward | 84.2 | 79.3 | 82.0 | 1.0012 |
| Middle - jump | 83.2 | 79.3 | 81.5 | .6276 |
| Jungle gym | 69.9 | 85.7 | 75.7 | 12.2048** |
| Hand bar | 48.7 | 54.7 | 52.0 | .6217 |
| Hops on one foot | 67.5 | 83.7 | 74.1 | 10.9409** |
| Stomach roll | 39.5 | 49.6 | 43.3 | 3.0659 |
| Somersault | 58.7 | 79.8 | 66.7 | 14.9167** |
| Claps to rhythm | 66.2 | 85.3 | 74.0 | 15.3207** |
| Push-pull activity | 64.6 | 83.0 | 72.1 | 13.3793** |
| Marches to rhythm | 56.7 | 74.8 | 64.3 | 10.5282** |
| Response to rest period | 68.0 | 72.8 | 70.0 | .8726 |
| Carries liquid | 83.9 | 86.7 | 85.0 | .4769 |
| Cuts with scissors | 77.6 | 74.6 | 76.4 | .3878 |
| Catches bounced ball | 71.0 | 84.6 | 76.5 | 8.2755** |

Note.—Figures are in terms of percent passing.

[a] Max. N = 204.

[b] Max. N = 136.

**Significant at .01 level.

# Appendix G

## Social Developmental Chart

Examination copy, scoring criteria, and chi square analysis of performance by sex and race.

Figure 12

**SOCIAL**

**DEVELOPMENTAL**

**CHART**

Date ____________

Examiner ____________

|  | ACTIVITY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | Takes Turns | Shares Materials | Adult Attention | Pleases Adults | Hazard Concept | Picks-up | Toilet Needs | Eating Habits | Others by Name | Yours-Mine Concept | Controls Anger | Selects Activities | Completes Tasks | Increases Contacts | Follower | Leader | COMMENT |
| 1. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 4. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 11. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 13. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 15. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 17. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 18. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 19. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

### Figure 13

### Scoring Criteria for Use with Social Developmental Chart

(Many of these activities must be subjectively appraised and thus may not be evaluated by means of a structured examination)

| | |
|---|---|
| Takes Turns | - does not aggressively seek the position of first or is willing to wait his turn. |
| Shares Materials | - displays give and take attitude regarding the use of materials, toys, etc. |
| Adult Attention | - does not demand adult attention. |
| Pleases Adults | - actively strives to please adults. |
| Hazard Concept | - avoids throwing objects and reckless play. |
| Picks-up | - participates in clean-up following activities. |
| Toilet Needs | - able to care for his bathroom needs. |
| Eating Habits | - displays appropriate eating behavior. |
| Others by Name | - refers to or calls adults and peers by name. |
| Yours-Mine Concept | - demonstrates an awareness of possession and ownership |
| Controls Anger | - does not loose control of himself upon becoming angry. |
| Selects Activities | - independently selects toys and activities. |
| Completes Tasks | - works on a project until completion. |
| Increases Contacts | - increases his circle of peer association |
| Follower | - generally a follower of others. |
| Leader | - demonstrates a capacity to organize and provide leadership for others. |

Table 24

Chi Square Test of Items
From Social Developmental Chart - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| Takes turns | 57.5 | 73.5 | 9.8035** |
| Shares materials | 61.3 | 68.3 | 1.8293 |
| Adult attention | 49.2 | 59.3 | 3.5744 |
| Pleases adults | 56.4 | 72.5 | 9.7834** |
| Hazard concept | 61.9 | 78.9 | 11.9749** |
| Picks-up | 66.1 | 68.9 | .2986 |
| Toilet needs | 95.0 | 95.8 | .0062 |
| Eating habits | 69.4 | 68.9 | .0138 |
| Others by name | 34.4 | 29.9 | .8041 |
| Yours - mine concept | 60.2 | 65.3 | .9460 |
| Controls anger | 66.9 | 80.8 | 8.7383** |
| Selects activities | 79.6 | 67.7 | 6.3622* |
| Completes tasks | 57.2 | 57.9 | .0137 |
| Increases contacts | 64.1 | 54.8 | 3.1475 |
| Follower | 51.4 | 57.1 | 1.1650 |
| Leader | 30.4 | 29.2 | .0620 |

Note.—Figures are in terms of percent passing.

[a] Max. N = 181.

[b] Max. N = 169.

*Significant at .05 level.

**Significant at .01 level.

Table 25

Chi Square Test of Items
From Social Developmental Chart - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| Takes turns | 66.0 | 63.8 | 65.1 | .1767 |
| Shares materials | 63.3 | 66.7 | 64.7 | .4197 |
| Adult attention | 48.8 | 61.7 | 54.0 | 5.6277* |
| Pleases adults | 61.8 | 67.4 | 64.1 | 1.1184 |
| Hazard concept | 69.1 | 71.4 | 70.0 | .2191 |
| Picks-up | 67.0 | 68.1 | 67.4 | .0457 |
| Toilet needs | 94.7 | 96.5 | 95.4 | .6123 |
| Eating habits | 68.0 | 70.9 | 69.2 | .3441 |
| Others by name | 30.4 | 35.0 | 32.3 | .7963 |
| Yours - mine concept | 64.7 | 59.6 | 62.6 | .9542 |
| Controls anger | 71.5 | 76.6 | 73.6 | 1.1209 |
| Selects activities | 74.9 | 72.3 | 73.9 | .2799 |
| Completes tasks | 58.6 | 56.0 | 57.5 | .2262 |
| Increases contacts | 64.4 | 52.5 | 59.6 | 4.9761* |
| Follower | 53.4 | 55.3 | 54.2 | .1292 |
| Leader | 26.9 | 34.0 | 29.8 | 2.0361 |

Note.—Figures are in terms of percent passing.

[a] Max. N = 209.

[b] Max. N = 141.

*Significant at .05 level.

# Appendix H

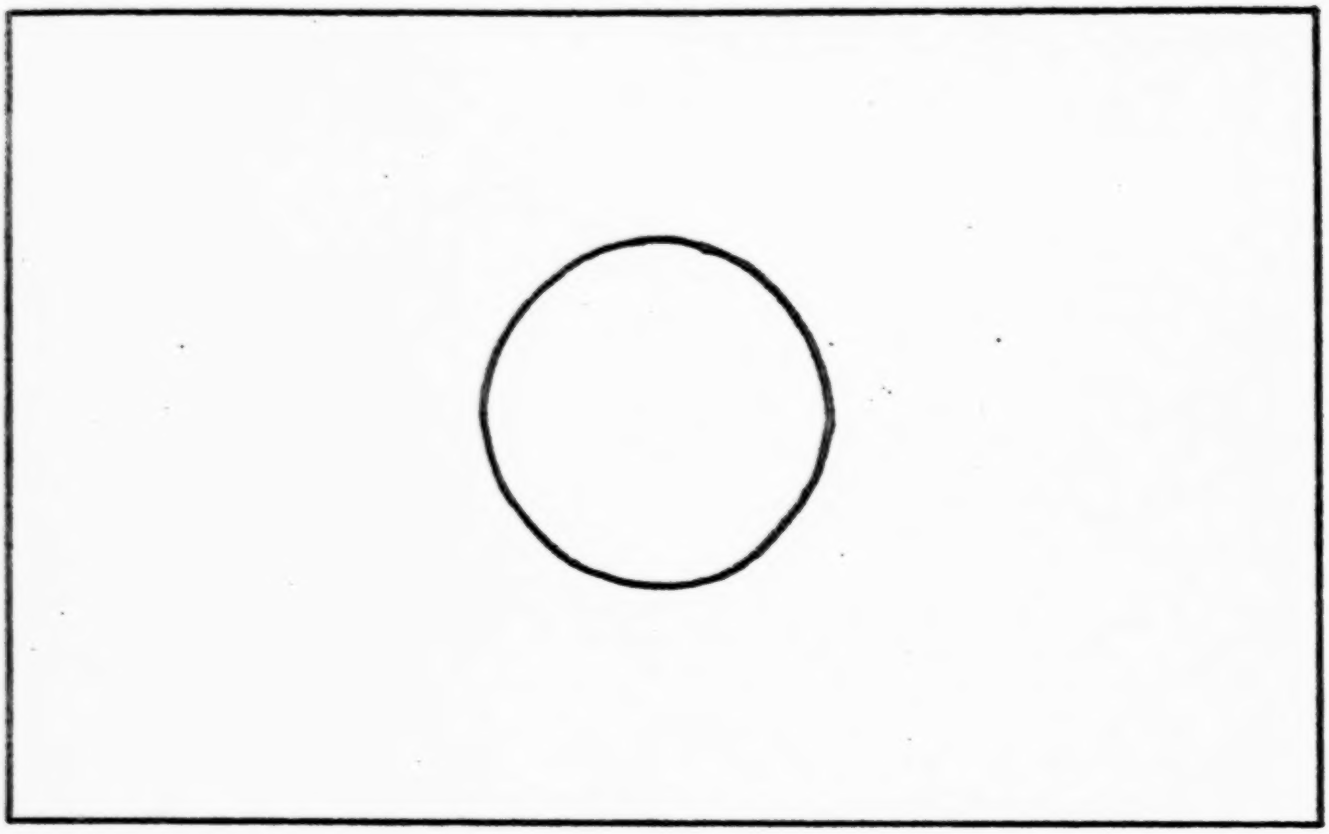
## Perceptual Drawings

Examination plates, instructions, and chi square analysis of performance by sex and race.

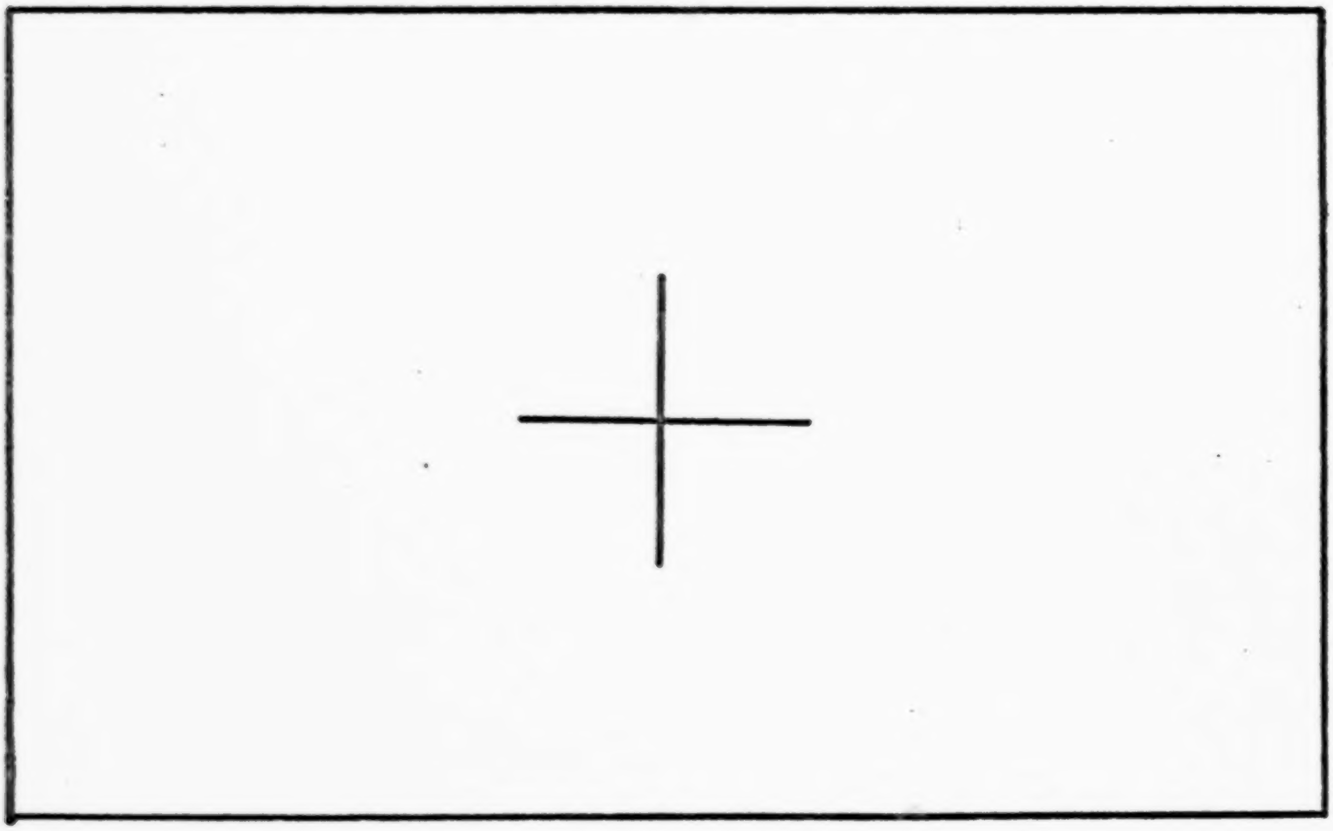
Figure 14

Copy Forms Used with Perceptual Drawings

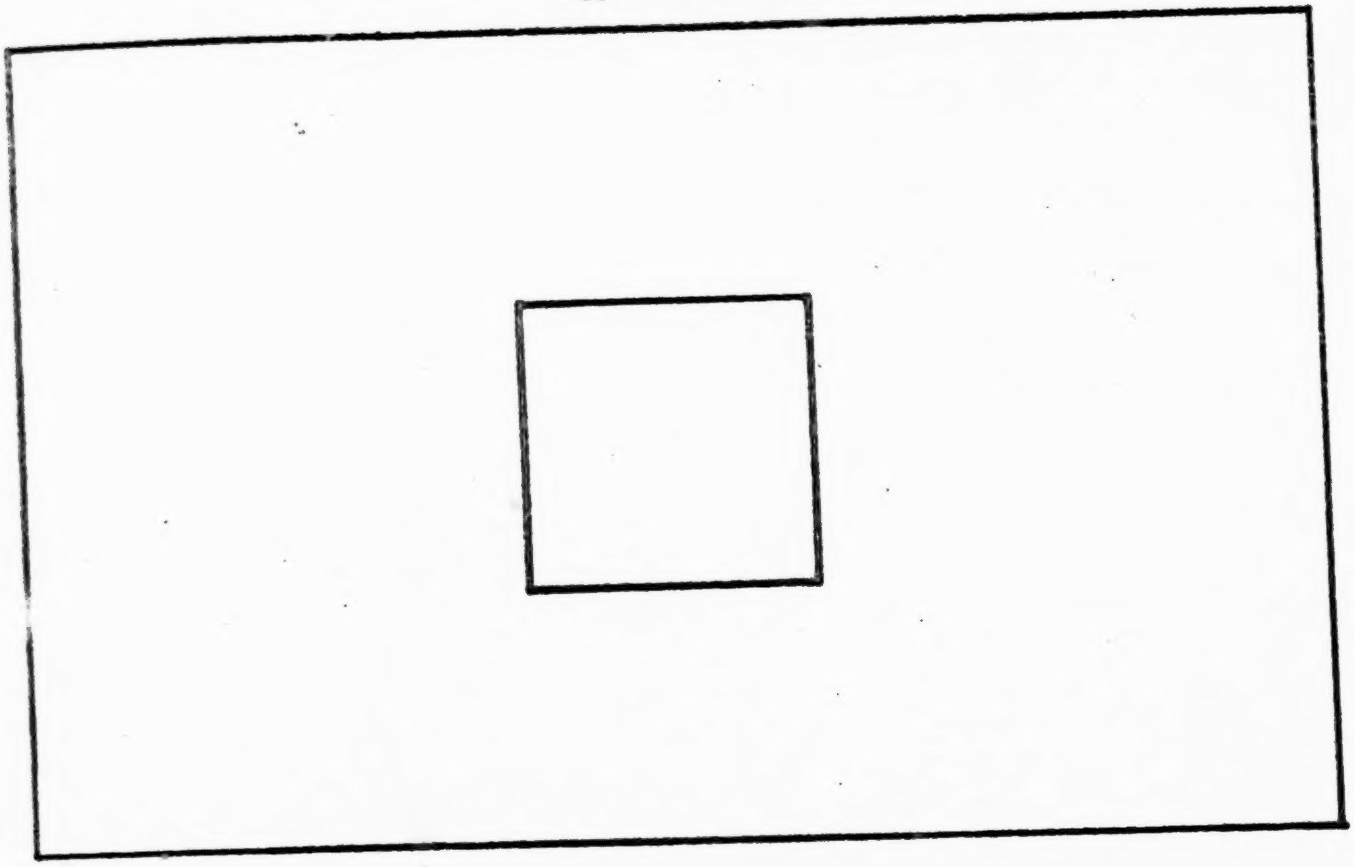
Copy Form 1



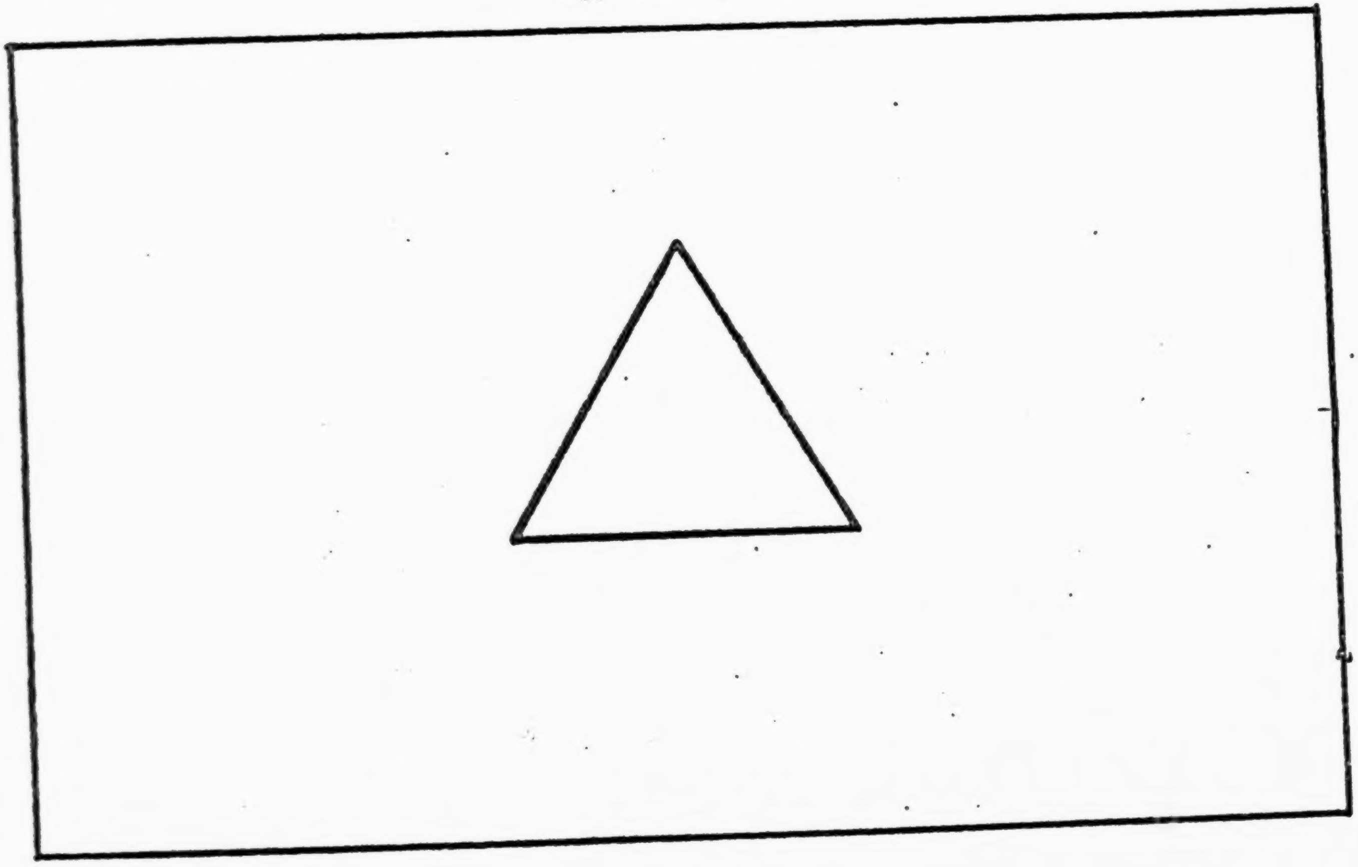
Copy Form 2



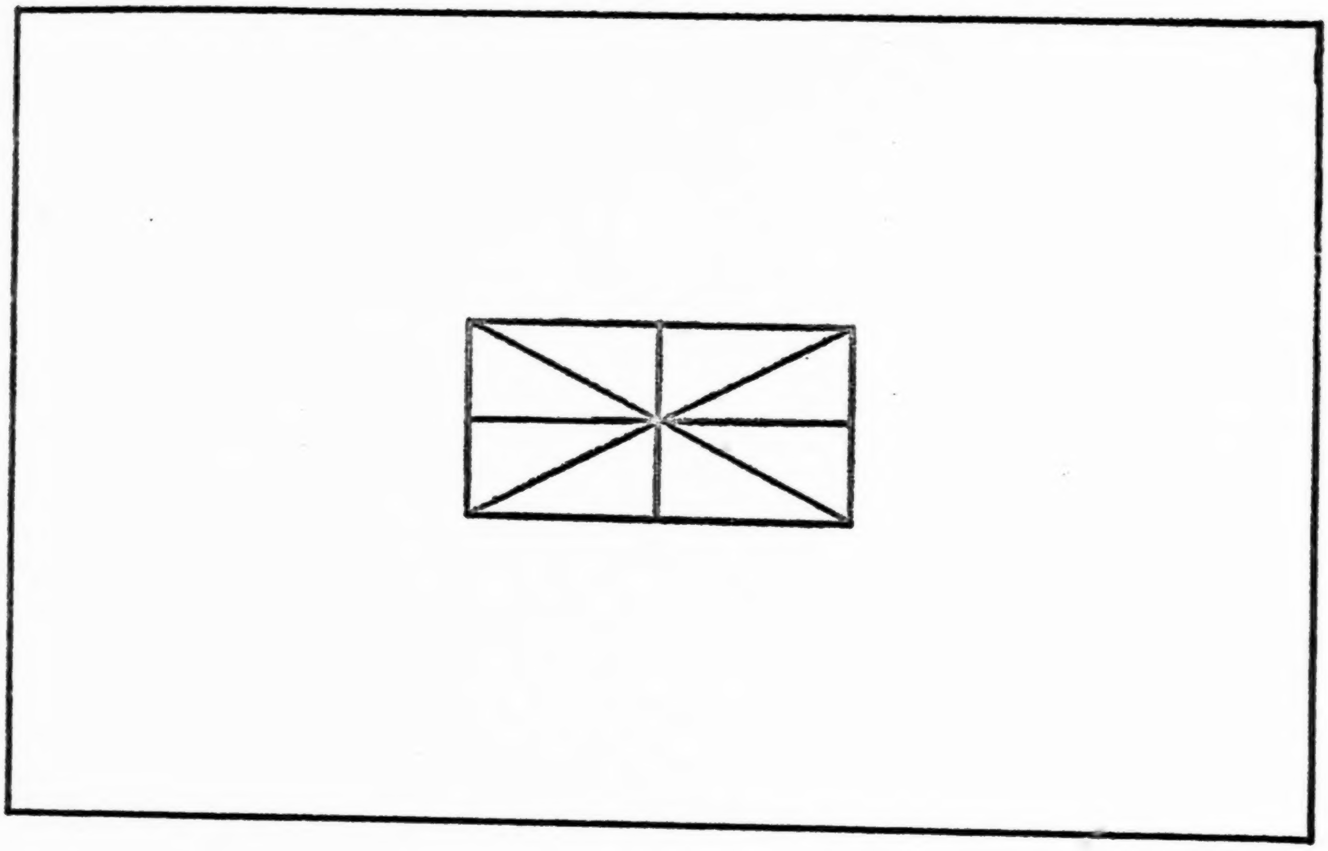
Copy Form 3



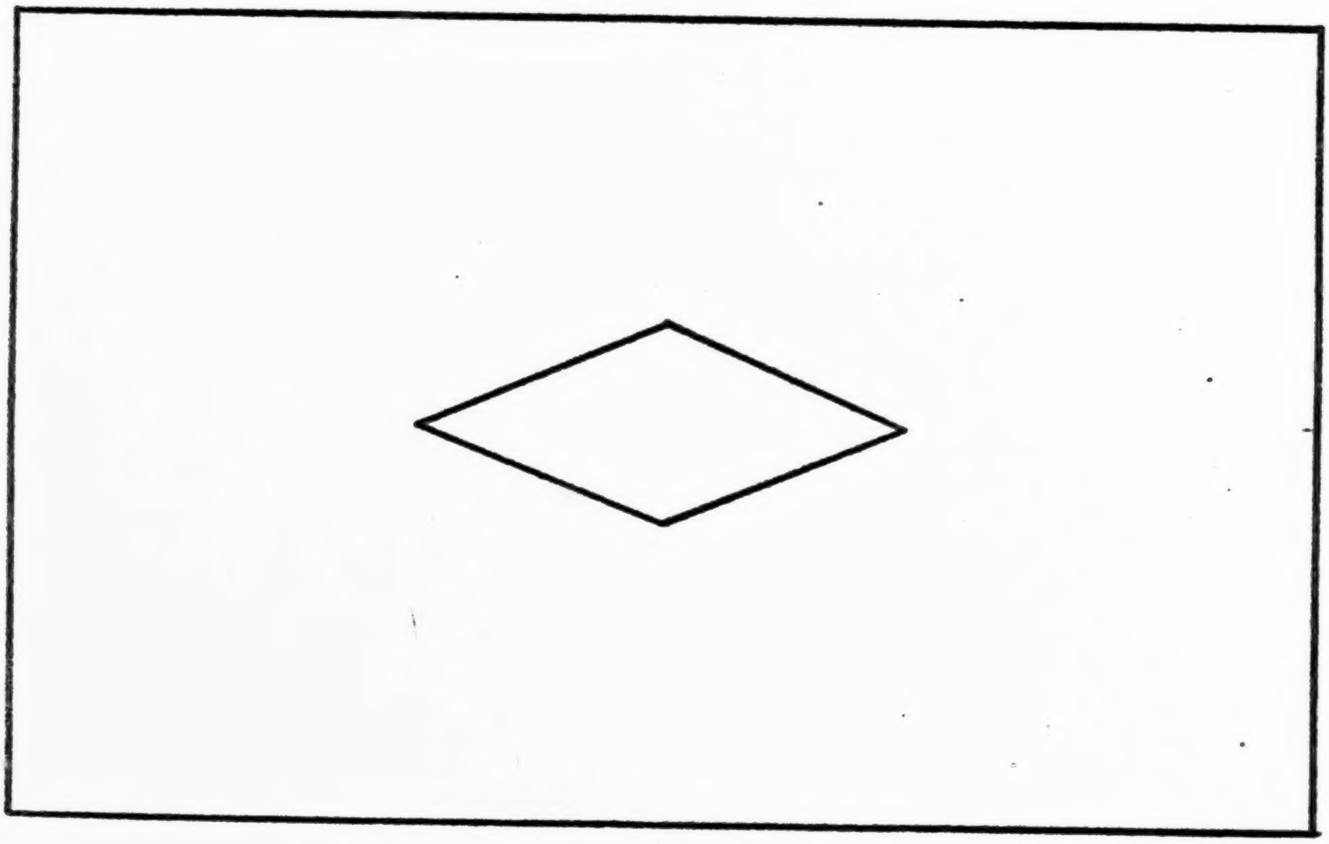
Copy Form 4



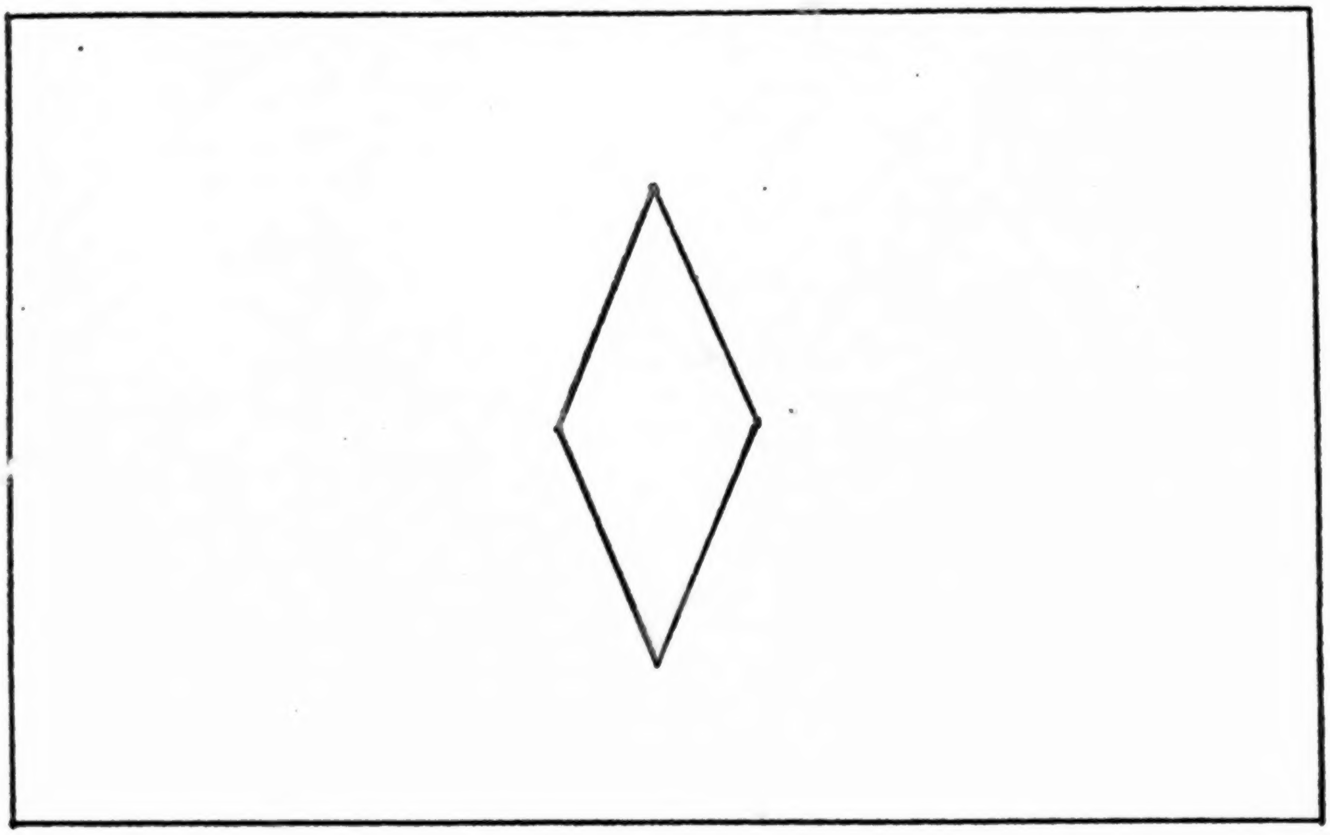
Copy Form 5



Copy Form 6



**Copy Form 7**



## Figure 15

## Instructions for Use with Perceptual Drawings

Materials

- $8\frac{1}{2}$ x 11 sheet of white mimeograph paper
  (Use the back of the sheet if more than $\frac{1}{4}$ of the initial side is taken up by the letters and numbers.)
- primary pencil
- copy forms (7 plates)

Letters and Numbers

a. letters

"Can you print any letters?"

or

"Can you print your name?"

Record:
1. flow of printing (L→R, R→L)
2. placement on paper (TL, TR, ML, MR, BL, BR)
3. pencil grasp (appropriate, inappropriate)
4. reversals

If they ask where to draw say "anywhere you choose."
If they ask big or small letters say "any kind you want."

b. numbers

"Write the numbers you know."

or

"Write the numbers from 1 to 20"

If unable to respond ask, "Write how old you are."

Record: same as above for letters

Copy Forms

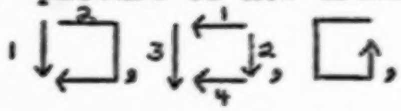
Show the cards to the child one at a time by placing them beyond the upper edge of the paper. Ask the child to "Make one just like mine on your paper."

Record:

A. Circle
   1. point of initiation
   2. direction (CCW, CW)

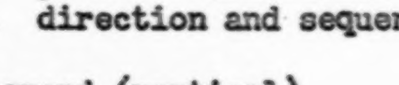
B. Cross
   1. order of drawing lines (VH, HV, VHH, HVV, other)
   2. number of lines (2, 3, 4)
   3. direction of vertical line (↓↑)
   4. direction of horizontal line (⇄)

C. Square
   1. point of initiation
   2. number of lines (1, 2, 3, 4)
   3. picture of how drawn



, etc.

D. Triangle
   1. point of initiation
   2. number of lines (1, 2, 3, 4)
   3. picture of how drawn



, etc.

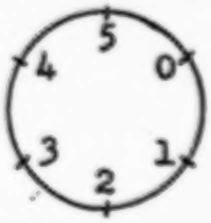
E. Divided rectangle
   1. point of initiation
   2. direction and sequence of lines (picture)

F. Diamond (horizontal)
   1. point of initiation
   2. direction and sequence of lines (picture)

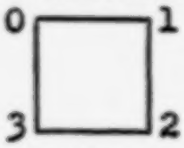
G. Diamond (vertical)
   1. point of initiation
   2. direction and sequence of lines (picture)

Table 26

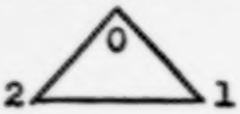
Chi Square Test of Items
From Perceptual Drawings - Sex

| | Male[a] | Female[b] | df | Chi Square |
|---|---|---|---|---|
| Appropriate pencil grasp | 66.4 | 78.9 | 1 | 5.5318* |
| Printed letters | 40.1 | 47.0 | 1 | 1.3740 |
| Flow of printing (L→R) | 85.2 | 93.8 | 1 | 1.5972 |
| Placement on paper | | | 3 | 5.6942 |
| Top left | 49.2 | 65.6 | | |
| Top right | 19.7 | 9.4 | | |
| Middle left | 13.1 | 14.1 | | |
| Middle right | 16.4 | 7.8 | | |
| Bottom left | 0.6 | 1.6 | | |
| Bottom right | 0 | 1.6 | | |
| Reversals | 65.6 | 63.1 | 1 | .0854 |
| Printed numbers | 11.8 | 17.2 | 1 | 1.6426 |
| Flow of printing (L→R) | 83.3 | 100 | | |
| Placement on paper | | | 2 | 6.1634* |
| Top left | 16.7 | 50.0 | | |
| Top right | 0 | 0 | | |
| Middle left | 38.9 | 37.5 | | |
| Middle right | 38.9 | 8.3 | | |
| Bottom left | 0 | 4.2 | | |
| Bottom right | 5.6 | 0 | | |
| Reversals | 11.1 | 29.2 | 1 | 1.5264 |
| Circle drawing | 100 | 100 | | |
| Point of initiation | | | 5 | 4.1578 |
| 0  | 14.5 | 7.5 | | |
| 1 | 7.2 | 7.5 | | |
| 2 | 20.4 | 19.4 | | |
| 3 | 23.0 | 29.1 | | |
| 4 | 13.8 | 10.4 | | |
| 5 | 21.1 | 26.1 | | |
| Direction | | | 1 | .9427 |
| Counterclockwise | 36.2 | 41.8 | | |
| Clockwise | 63.8 | 58.2 | | |
| Cross drawing | 97.4 | 97.8 | | |
| Order of drawing | | | 3 | 1.1816 |
| Vert. - Horz. | 72.2 | 77.1 | | |
| Horz. - Vert. | 10.6 | 11.5 | | |
| Vert. - Horz. - Horz. | 12.6 | 10.7 | | |
| Horz. - Vert. - Vert. | 2.0 | 0.8 | | |
| Other | 2.6 | 0 | | |

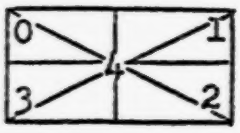
(Table continued on next page)

| | Male$^a$ | Female$^b$ | df | Chi Square |
|---|---|---|---|---|
| Number of lines | | | 1 | 1.0239 |
| 1 | 0 | 0 | | |
| 2 | 82.1 | 87.0 | | |
| 3 | 17.2 | 13.0 | | |
| 4 | 0.7 | 0 | | |
| Vertical line (↓) | 85.4 | 95.4 | 1 | 7.8268** |
| Horizontal line (⟶) | 78.3 | 79.4 | 1 | .0143 |
| Square drawing | 31.5 | 44.3 | 1 | 4.8209* |
| Point of initiation | | | 3 | 5.7011 |
| 0  | 44.1 | 54.3 | | |
| 1 | 23.4 | 19.4 | | |
| 2 | 6.9 | 7.8 | | |
| 3 | 25.5 | 18.6 | | |
| Number of lines | | | 3 | 4.2559 |
| 1 | 22.9 | 17.1 | | |
| 2 | 10.4 | 8.5 | | |
| 3 | 11.1 | 7.0 | | |
| 4 | 55.6 | 67.4 | | |
| First stroke | | | 7 | 12.5020 |
| Left side down | 31.3 | 45.0 | | |
| Left side up | 17.4 | 14.0 | | |
| Right side down | 19.4 | 14.7 | | |
| Right side up | 4.2 | 3.9 | | |
| Top, left to right | 12.5 | 10.1 | | |
| Top, right to left | 3.5 | 5.4 | | |
| Bottom, left to right | 9.0 | 3.9 | | |
| Bottom, right to left | 2.8 | 3.1 | | |
| Second stroke | | | 7 | 7.1899 |
| Left side down | 8.1 | 2.8 | | |
| Left side up | 5.4 | 5.6 | | |
| Right side down | 14.4 | 14.0 | | |
| Right side up | 5.4 | 2.8 | | |
| Top, left to right | 24.3 | 34.6 | | |
| Top, right to left | 15.3 | 10.3 | | |
| Bottom, left to right | 18.9 | 21.5 | | |
| Bottom, right to left | 8.1 | 8.4 | | |
| Third stroke | | | 7 | 10.2631 |
| Left side down | 13.5 | 9.4 | | |
| Left side up | 10.4 | 6.3 | | |
| Right side down | 24.0 | 32.3 | | |
| Right side up | 13.5 | 24.0 | | |
| Top, left to right | 13.5 | 7.3 | | |
| Top, right to left | 5.2 | 1.0 | | |
| Bottom, left to right | 9.4 | 8.3 | | |
| Bottom, right to left | 10.4 | 11.5 | | |

(Table continued on next page)

| | Male[a] | Female[b] | df | Chi Square |
|---|---|---|---|---|
| Fourth stroke | | | 7 | 10.7577 |
| Left side down | 3.8 | 6.9 | | |
| Left side up | 7.5 | 5.8 | | |
| Right side down | 13.8 | 4.6 | | |
| Right side up | 5.0 | 5.7 | | |
| Top, left to right | 15.0 | 6.9 | | |
| Top, right to left | 15.0 | 24.1 | | |
| Bottom, left to right | 18.8 | 17.2 | | |
| Bottom, right to left | 21.3 | 28.7 | | |
| Triangle drawing | 36.7 | 47.6 | 1 | 3.3057 |
| Point of initiation | | | 2 | .8389 |
| 0  | 60.9 | 62.6 | | |
| 1 | 8.7 | 9.8 | | |
| 2 | 30.4 | 26.8 | | |
| Other | 0 | 0.8 | | |
| Number of lines | | | 3 | 1.5943 |
| 1 | 12.4 | 8.1 | | |
| 2 | 13.9 | 13.8 | | |
| 3 | 64.2 | 69.9 | | |
| 4 | 9.5 | 8.1 | | |
| First stroke | | | 5 | 4.7418 |
| Left side down | 35.8 | 42.6 | | |
| Left side up | 13.9 | 17.2 | | |
| Right side down | 24.1 | 20.5 | | |
| Right side up | 5.8 | 7.4 | | |
| Bottom, left to right | 17.5 | 10.7 | | |
| Bottom, right to left | 2.9 | 1.6 | | |
| Second stroke | | | 5 | 5.8597 |
| Left side down | 21.7 | 17.3 | | |
| Left side up | 9.2 | 6.4 | | |
| Right side down | 37.5 | 47.3 | | |
| Right side up | 13.3 | 6.4 | | |
| Bottom, left to right | 12.5 | 14.5 | | |
| Bottom, right to left | 5.8 | 8.2 | | |
| Third stroke | | | 5 | 2.4519 |
| Left side down | 5.0 | 6.4 | | |
| Left side up | 15.8 | 9.6 | | |
| Right side down | 4.0 | 4.3 | | |
| Right side up | 16.8 | 14.9 | | |
| Bottom, left to right | 33.7 | 34.0 | | |
| Bottom, right to left | 24.8 | 30.9 | | |

(Table continued on next page)

| | Male[a] | Female[b] | df | Chi Square |
|---|---|---|---|---|
| Rectangle drawing | 3.4 | 3.9 | | |
| Point of initiation | | | 4 | 1.9947 |
| 0  | 44.9 | 53.2 | | |
| 1 | 18.1 | 16.1 | | |
| 2 | 7.2 | 6.5 | | |
| 3 | 21.0 | 16.1 | | |
| 4 | 0 | 0 | | |
| Inside | 8.7 | 8.1 | | |
| First stroke | | | 7 | 8.7809 |
| Left side down | 34.1 | 30.2 | | |
| Left side up | 7.1 | 9.5 | | |
| Right side down | 12.7 | 11.2 | | |
| Right side up | 5.6 | 6.0 | | |
| Top, left to right | 15.1 | 26.7 | | |
| Top, right to left | 7.1 | 6.0 | | |
| Bottom, left to right | 16.7 | 7.8 | | |
| Bottom, right to left | 1.6 | 1.7 | | |
| Other | 0 | 0.9 | | |
| Horizontal diamond drawing | 2.7 | 3.1 | | |
| Point of initiation | | | 7 | 2.6078 |
| Top, right to left | 31.3 | 25.6 | | |
| Top, left to right | 22.2 | 22.4 | | |
| Bottom, right to left | 2.1 | 4.0 | | |
| Bottom, left to right | 9.7 | 9.6 | | |
| Left side up | 11.8 | 12.8 | | |
| Left side down | 13.2 | 12.0 | | |
| Right side up | 4.9 | 6.4 | | |
| Right side down | 4.9 | 7.2 | | |
| Vertical diamond drawing | 1.4 | 1.6 | | |
| Point of initiation | | | 7 | 10.0189 |
| Top, right to left | 40.6 | 36.5 | | |
| Top, left to right | 17.5 | 14.3 | | |
| Bottom, right to left | 4.9 | 4.8 | | |
| Bottom, left to right | 5.6 | 4.0 | | |
| Left side up | 12.6 | 11.9 | | |
| Left side down | 7.0 | 10.3 | | |
| Right side up | 7.7 | 6.3 | | |
| Right side down | 4.2 | 11.9 | | |

Note.--Figures are in terms of percent.

[a] N = 152.

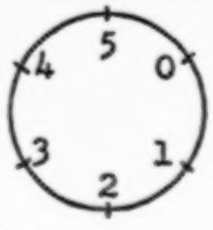
[b] N = 134.

*Significant at .05 level.

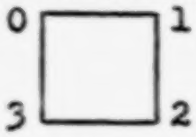
**Significant at .01 level.

Table 27

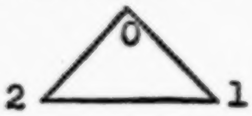
Chi Square Test of Items
From Perceptual Drawings - Race

| | Caucasian[a] | Negro[b] | Combined | df | Chi Square |
|---|---|---|---|---|---|
| Appropriate pencil grasp | 72.6 | 71.9 | 72.3 | 1 | .0151 |
| Printed letters | 48.2 | 36.9 | 43.4 | 1 | 3.6281 |
| Flow of printing (L→R) | 91.1 | 87.0 | 89.6 | 1 | .1892 |
| Placement on paper | | | | 3 | 1.5148 |
| Top left | 58.2 | 56.5 | 57.6 | | |
| Top right | 15.2 | 13.0 | 14.4 | | |
| Middle Left | 11.4 | 17.4 | 13.6 | | |
| Middle right | 13.9 | 8.7 | 12.0 | | |
| Bottom left | 1.3 | 2.2 | 1.6 | | |
| Bottom right | 0 | 2.2 | 0.8 | | |
| Reversals | 68.4 | 57.4 | 64.3 | 1 | 1.5271 |
| Printed numbers | 16.5 | 11.5 | 14.3 | 1 | 1.4173 |
| Flow of printing (L→R) | 88.9 | 100 | 92.9 | | |
| Placement on paper | | | | 2 | .4445 |
| Top left | 37.0 | 33.3 | 35.7 | | |
| Top right | 0 | 0 | 0 | | |
| Middle left | 33.3 | 46.7 | 38.1 | | |
| Middle right | 22.2 | 20.0 | 21.4 | | |
| Bottom left | 3.7 | 0 | 2.4 | | |
| Bottom right | 3.7 | 0 | 2.4 | | |
| Reversals | 22.2 | 20.0 | 21.4 | 1 | .0503 |
| Circle drawing | 100 | 100 | 100 | | |
| Point of initiation | | | | 5 | 4.1706 |
| 0  | 9.8 | 13.1 | 11.2 | | |
| 1 | 8.5 | 5.7 | 7.3 | | |
| 2 | 22.6 | 16.4 | 19.9 | | |
| 3 | 23.2 | 29.5 | 25.9 | | |
| 4 | 11.0 | 13.9 | 12.2 | | |
| 5 | 25.0 | 21.3 | 23.4 | | |
| Direction | | | | 1 | 2.4268 |
| Counterclockwise | 42.7 | 33.6 | 38.8 | | |
| Clockwise | 57.3 | 66.4 | 61.2 | | |
| Cross drawing | 97.5 | 99.2 | 98.2 | | |
| Order of drawing | | | | 3 | 11.4965** |
| Vert. - Horz. | 79.0 | 68.3 | 74.5 | | |
| Horz. - Vert. | 5.6 | 18.3 | 11.0 | | |
| Vert. - Horz. - Horz. | 12.3 | 10.8 | 11.7 | | |
| Horz. - Vert. - Vert. | 1.2 | 1.7 | 1.4 | | |
| Other | 1.9 | 0.8 | 1.4 | | |

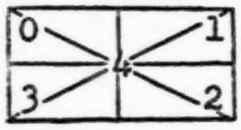
(Table continued on next page)

| | Caucasian[a] | Negro[b] | Combined | df | Chi Square |
|---|---|---|---|---|---|
| Number of lines | | | | 1 | 1.2678 |
| 1 | 0 | 0 | 0 | | |
| 2 | 82.7 | 86.7 | 84.4 | | |
| 3 | 16.7 | 13.3 | 15.2 | | |
| 4 | 0.6 | 0 | 0.4 | | |
| Vertical line (↓) | 88.9 | 91.7 | 90.1 | 1 | .5948 |
| Horizontal line (⟶) | 77.8 | 80.8 | 79.1 | 1 | .3890 |
| Square drawing | 40.6 | 33.3 | 37.5 | 1 | 1.5556 |
| Point of initiation | | | | 3 | 1.4473 |
| 0  | 51.3 | 46.2 | 48.9 | | |
| 1 | 21.8 | 21.4 | 21.5 | | |
| 2 | 7.7 | 6.8 | 7.3 | | |
| 3 | 19.9 | 25.6 | 22.3 | | |
| Number of lines | | | | 3 | 19.4192** |
| 1 | 12.8 | 29.9 | 20.1 | | |
| 2 | 6.4 | 13.7 | 9.5 | | |
| 3 | 9.6 | 8.5 | 9.2 | | |
| 4 | 71.2 | 47.9 | 61.2 | | |
| First stroke | | | | 7 | 4.4525 |
| Left side down | 40.4 | 34.2 | 37.7 | | |
| Left side up | 12.2 | 20.5 | 15.8 | | |
| Right side down | 17.9 | 16.2 | 17.2 | | |
| Right side up | 4.5 | 3.4 | 4.0 | | |
| Top, left to right | 10.9 | 12.0 | 11.4 | | |
| Top, right to left | 3.8 | 5.1 | 4.4 | | |
| Bottom, left to right | 7.1 | 6.0 | 6.6 | | |
| Bottom, right to left | 3.2 | 2.6 | 2.9 | | |
| Second stroke | | | | 7 | 3.5628 |
| Left side down | 5.9 | 4.9 | 5.5 | | |
| Left side up | 6.6 | 3.7 | 5.5 | | |
| Right side down | 12.5 | 17.1 | 14.2 | | |
| Right side up | 4.4 | 3.7 | 4.1 | | |
| Top, left to right | 31.6 | 25.6 | 29.4 | | |
| Top, right to left | 13.2 | 12.2 | 12.8 | | |
| Bottom, left to right | 17.6 | 24.4 | 20.2 | | |
| Bottom, right to left | 8.1 | 8.5 | 8.3 | | |
| Third stroke | | | | 7 | 6.4560 |
| Left side down | 10.3 | 13.6 | 11.5 | | |
| Left side up | 8.7 | 7.6 | 8.3 | | |
| Right side down | 30.2 | 24.2 | 28.1 | | |
| Right side up | 15.1 | 25.8 | 18.8 | | |
| Top, left to right | 12.7 | 6.1 | 10.4 | | |
| Top, right to left | 4.0 | 1.5 | 3.1 | | |
| Bottom, left to right | 8.7 | 9.1 | 8.9 | | |
| Bottom, right to left | 10.3 | 12.1 | 10.9 | | |

(Table continued on next page)

| | Caucasian[a] | Negro[b] | Combined | df | Chi Square |
|---|---|---|---|---|---|
| Fourth stroke | | | | 7 | 8.4398 |
| Left side down | 5.4 | 5.5 | 5.4 | | |
| Left side up | 7.2 | 5.5 | 6.6 | | |
| Right side down | 9.9 | 7.1 | 9.0 | | |
| Right side up | 5.4 | 5.5 | 5.4 | | |
| Top, left to right | 6.3 | 19.6 | 10.8 | | |
| Top, right to left | 19.8 | 19.6 | 19.8 | | |
| Bottom, left to right | 19.8 | 14.3 | 18.0 | | |
| Bottom, right to left | 26.1 | 23.2 | 25.1 | | |
| Triangle drawing | 47.7 | 33.9 | 41.8 | 1 | 5.2793* |
| Point of initiation | | | | 2 | 1.3570 |
| 0  | 60.4 | 63.4 | 61.7 | | |
| 1 | 8.1 | 10.7 | 9.2 | | |
| 2 | 30.9 | 25.9 | 28.7 | | |
| Other | 0.7 | 0 | 0.4 | | |
| Number of lines | | | | 3 | 8.8223 |
| 1 | 7.5 | 14.4 | 10.4 | | |
| 2 | 10.1 | 18.9 | 13.8 | | |
| 3 | 72.5 | 59.5 | 66.9 | | |
| 4 | 10.1 | 7.2 | 8.8 | | |
| First stroke | | | | 5 | 5.6504 |
| Left side down | 35.8 | 43.2 | 39.0 | | |
| Left side up | 14.9 | 16.2 | 15.4 | | |
| Right side down | 25.0 | 18.9 | 22.4 | | |
| Right side up | 4.7 | 9.0 | 6.6 | | |
| Bottom, left to right | 16.9 | 10.8 | 14.3 | | |
| Bottom, right to left | 2.7 | 1.8 | 2.3 | | |
| Second stroke | | | | 5 | 2.4223 |
| Left side down | 20.7 | 17.9 | 19.6 | | |
| Left side up | 8.9 | 6.3 | 7.8 | | |
| Right side down | 40.0 | 45.3 | 42.2 | | |
| Right side up | 10.4 | 9.5 | 10.0 | | |
| Bottom, left to right | 11.9 | 15.8 | 13.5 | | |
| Bottom, right to left | 8.1 | 5.3 | 7.0 | | |
| Third stroke | | | | 5 | 2.8812 |
| Left side down | 6.5 | 4.2 | 5.6 | | |
| Left side up | 14.6 | 9.7 | 12.8 | | |
| Right side down | 3.3 | 5.6 | 4.1 | | |
| Right side up | 13.8 | 19.4 | 15.9 | | |
| Bottom, left to right | 33.3 | 34.7 | 33.8 | | |
| Bottom, right to left | 28.5 | 26.4 | 27.7 | | |

(Table continued on next page)

| | Caucasian[a] | Negro[b] | Combined | df | Chi Square |
|---|---|---|---|---|---|
| Rectangle drawing | 4.5 | 2.5 | 3.7 | | |
| Point of initiation | | | | 4 | .4216 |
| 0  | 48.0 | 50.0 | 48.9 | | |
| 1 | 18.0 | 16.1 | 17.2 | | |
| 2 | 7.3 | 6.3 | 6.9 | | |
| 3 | 18.0 | 19.6 | 18.7 | | |
| 4 | 0 | 0 | 0 | | |
| Inside | 8.7 | 8.0 | 8.4 | | |
| First stroke | | | | 7 | 5.4142 |
| Left side down | 31.9 | 32.7 | 32.2 | | |
| Left side up | 6.5 | 10.6 | 8.3 | | |
| Right side down | 14.5 | 8.7 | 12.0 | | |
| Right side up | 7.2 | 3.8 | 5.8 | | |
| Top, left to right | 20.3 | 21.2 | 20.7 | | |
| Top, right to left | 5.1 | 8.7 | 6.6 | | |
| Bottom, left to right | 13.0 | 11.5 | 12.4 | | |
| Bottom, right to left | 1.4 | 1.9 | 1.7 | | |
| Other | 0 | 1.0 | 0.4 | | |
| Horizontal diamond drawing | 3.8 | 1.7 | 2.9 | | |
| Point of initiation | | | | 7 | 8.5966 |
| Top, right to left | 28.6 | 28.7 | 28.6 | | |
| Top, left to right | 21.4 | 23.5 | 22.3 | | |
| Bottom, right to left | 3.2 | 2.6 | 3.0 | | |
| Bottom, left to right | 13.6 | 4.3 | 9.7 | | |
| Left side up | 10.4 | 14.8 | 12.3 | | |
| Left side down | 13.0 | 12.2 | 12.6 | | |
| Right side up | 5.2 | 6.1 | 5.6 | | |
| Right side down | 4.5 | 7.8 | 5.9 | | |
| Vertical diamond drawing | 1.9 | 0.9 | 1.5 | | |
| Point of initiation | | | | 7 | 4.8355 |
| Top, right to left | 38.1 | 39.5 | 38.7 | | |
| Top, left to right | 14.2 | 18.4 | 16.0 | | |
| Bottom, right to left | 5.8 | 3.5 | 4.8 | | |
| Bottom, left to right | 5.8 | 3.5 | 4.8 | | |
| Left side up | 10.3 | 14.9 | 12.3 | | |
| Left side down | 10.3 | 6.1 | 8.6 | | |
| Right side up | 7.1 | 7.0 | 7.1 | | |
| Right side down | 8.4 | 7.0 | 7.8 | | |

Note.--Figures are in terms of percent.

[a] N = 164.

[b] N = 122.

*Significant at .05 level.

**Significant at .01 level.

# Appendix I

## Stanford-Binet, Form L-M

Chi square analysis of performance by sex and race, mean and standard deviation of IQ scores, and t test of mean IQ scores between groups.

Table 28

Chi Square Test of Items
From Stanford-Binet, Form L-M - Sex

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| III-6 | | | |
| Comparison of balls | 100 | 100 | |
| Discrimination of pictures | 100 | 100 | |
| Response to pictures | 100 | 100 | |
| Comprehension I | 97.9 | 100 | |
| IV | | | |
| Picture vocabulary | 91.7 | 93.9 | |
| Naming objects | 97.9 | 95.9 | |
| Opposite analogies I | 87.5 | 89.8 | |
| Pictorial identification | 93.8 | 95.9 | |
| IV-6 | | | |
| Opposite analogies I | 70.8 | 79.6 | .9989 |
| Similarities and differences | 91.7 | 98.0 | .8876 |
| Three commissions | 85.4 | 89.8 | .1201 |
| Comprehension III | 75.0 | 95.9 | 6.9810** |
| V | | | |
| Picture completion: man | 77.1 | 77.6 | .0030 |
| Definitions | 91.7 | 93.9 | .0008 |
| Copying a square | 56.3 | 59.2 | .0855 |
| Patience: rectangles | 29.2 | 16.3 | 1.6062 |
| VI | | | |
| Vocabulary | 31.3 | 36.7 | .3250 |
| Differences | 18.8 | 30.6 | 1.2510 |
| Number concepts | 16.7 | 40.8 | 5.7610* |
| Opposite analogies II | 31.3 | 32.7 | .0220 |
| VII | | | |
| Similarities: two things | 0 | 2.0 | |
| Copying a diamond | 6.3 | 6.1 | .1564 |
| Comprehension IV | 12.5 | 16.3 | .0611 |
| 5 digits | 25.0 | 34.7 | 1.0872 |
| VIII | | | |
| Vocabulary | 2.1 | 8.2 | |
| Verbal absurdities I | 0 | 0 | |
| Similarities and differences | 2.1 | 0 | |
| Comprehension IV | 8.3 | 10.2 | |

(Table continued on next page)

| Item | Male[a] | Female[b] | Chi Square |
|---|---|---|---|
| IX | | | |
| Memory for designs I | 0 | 0 | |
| Rhymes | 2.1 | 0 | |
| Making change | 0 | 0 | |
| 4 digits reversed | 0 | 0 | |
| X | | | |
| Vocabulary | 2.1 | 0 | |
| Abstract words I | 0 | 0 | |
| Word meaning | 0 | 0 | |
| 6 digits | 0 | 0 | |

Note.—Figures are in terms of percent.
[a] N = 48.
[b] N = 49.
*Significant at .05 level.
**Significant at .01 level.

Table 29

Chi Square Test of Items
From Stanford-Binet, Form L-M - Race

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| III-6 | | | | |
| Comparison of balls | 100 | 100 | 100 | |
| Discrimination of pictures | 100 | 100 | 100 | |
| Response to pictures | 100 | 100 | 100 | |
| Comprehension I | 98.2 | 100 | 99.0 | |
| IV | | | | |
| Picture vocabulary | 92.9 | 92.7 | 92.8 | |
| Naming objects | 94.6 | 100 | 96.9 | |
| Opposite analogies I | 87.5 | 90.2 | 88.7 | |
| Pictorial identification | 94.6 | 95.1 | 94.8 | |
| IV-6 | | | | |
| Opposite analogies II | 73.2 | 78.0 | 75.3 | .0942 |
| Similarities and differences | 94.6 | 95.1 | 94.8 | .1291 |
| Three commissions | 85.7 | 90.2 | 87.6 | .1276 |
| Comprehension III | 85.8 | 85.4 | 85.6 | .0596 |
| V | | | | |
| Picture completion: man | 71.4 | 85.4 | 77.3 | 1.8874 |
| Definitions | 92.9 | 92.7 | 92.8 | .1328 |
| Copying a square | 57.1 | 58.5 | 57.7 | .0188 |
| Patience: rectangles | 30.4 | 12.2 | 22.7 | 3.4769 |
| VI | | | | |
| Vocabulary | 41.1 | 24.4 | 34.0 | 2.9343 |
| Differences | 32.1 | 14.6 | 24.7 | 3.0103 |
| Number concepts | 28.6 | 29.3 | 28.9 | .0056 |
| Opposite analogies II | 30.4 | 34.1 | 32.0 | .1563 |
| VII | | | | |
| Similarities: two things | 1.8 | 0 | 1.0 | |
| Copying a diamond | 7.1 | 4.9 | 6.2 | |
| Comprehension IV | 16.1 | 12.2 | 14.4 | .0596 |
| 5 digits | 25.0 | 36.6 | 29.9 | 1.5158 |
| VIII | | | | |
| Vocabulary | 7.1 | 2.4 | 5.2 | |
| Verbal absurdities I | 0 | 0 | 0 | |
| Similarities and differences | 1.8 | 0 | 1.0 | |
| Comprehension IV | 10.7 | 7.3 | 9.3 | |

(Table continued on next page)

| Item | Caucasian[a] | Negro[b] | Combined | Chi Square |
|---|---|---|---|---|
| IX | | | | |
| Memory for designs I | 0 | 0 | 0 | |
| Rhymes | 1.8 | 0 | 1.0 | |
| Making change | 0 | 0 | 0 | |
| 4 digits | 0 | 0 | 0 | |
| X | | | | |
| Vocabulary | 1.8 | 0 | 0 | |
| Abstract words I | 0 | 0 | 0 | |
| Word meaning | 0 | 0 | 0 | |
| 6 digits | 0 | 0 | 0 | |

Note.--Figures are in terms of percent.
[a] N = 56.
[b] N = 41.

Table 30

Mean and Standard Deviation of IQ Scores by Discrete Groups on the Stanford Binet, Form L-M

| Group | N | $\overline{X}$ | $s^2$ | s |
|---|---|---|---|---|
| Male | 48 | 94.08 | 203.27 | 14.26 |
| Female | 49 | 100.14 | 194.08 | 13.93 |
| Negro | 41 | 94.83 | 132.20 | 11.50 |
| White | 56 | 98.83 | 256.21 | 16.01 |
| Negro Male | 21 | 92.52 | 104.86 | 10.24 |
| White Male | 27 | 95.30 | 283.29 | 16.83 |
| Negro Female | 20 | 97.25 | 155.88 | 12.48 |
| White Female | 29 | 102.14 | 216.84 | 14.73 |
| Total | 97 | 97.14 | 205.83 | 14.35 |

### Table 31

### F Ratio, Standard Error of the Difference, And t Test of the mean IQ Scores Between Groups On the Stanford-Binet, Form L-M

| Groups Compared | F | $S_{\bar{X}_1 - \bar{X}_2}$ | df | t |
|---|---|---|---|---|
| Male<br>Female | 1.05 | 2.82 | 95 | 2.1489* |
| White<br>Negro | 1.94 | 2.79 | 95 | 1.4337 |
| White Male<br>Negro Male | 2.70 | 3.93 | 46 | 0.7074 |
| White Female<br>Negro Female | 1.39 | 3.92 | 47 | 1.2474 |
| White Male<br>White Female | 1.31 | 4.17 | 54 | 1.6403 |
| Negro Female<br>Negro Male | 1.49 | 3.61 | 39 | 1.3102 |
| White Male<br>Negro Female | 1.82 | 4.55 | 45 | 0.4286 |
| White Female<br>Negro Male | 2.07 | 3.53 | 48 | 2.7252** |

*Significant at .05 level.
**Significant at .01 level.

# Appendix J

## Sex by Race Analysis

Sex by race analysis tabled according to group comparisons.

Table 32

Sex by Race Analysis
(Male White vs. Female White)

| Examination Item | Instrument | Chi Square |
|---|---|---|
| | Male White > Female White | |
| Unable to remain seated for more than five minutes at a time | Psychol. Screening | 4.0640 |
| The provocative child | Psychol. Screening | 7.5836** |
| The disruptive child | Psychol. Screening | 14.9202** |
| How many wheels does a wheelbarrow have? | Presch. Inventory | 4.1962 |
| What do we call the first car on a train? | Presch. Inventory | 5.2507 |
| | Female White > Male White | |
| Comprehension III, Year IV-6 | Stanford-Binet | 7.7509** |
| The unhappy child | Psychol. Screening | 4.1196 |
| Singing a song from memory | Ment. Develpm. Chart | 4.6696 |
| Names colors | Ment. Develpm. Chart | 8.9668** |
| Shows colors | Ment. Develpm. Chart | 8.2457** |
| Naming 3 animals | Ment. Develpm. Chart | 7.2797** |
| Naming 3 fruit | Ment. Develpm. Chart | 4.5292 |
| Arranging pictures in sequence | Ment. Develpm. Chart | 6.3457 |
| Push-pull activity | Phys. Develpm. Chart | 5.5769 |
| Carries liquid | Phys. Develpm. Chart | 9.0259** |
| Cuts with scissors | Phys. Develpm. Chart | 6.9433** |
| Takes turns | Soc. Develpm. Chart | 16.1340** |
| Pleases adults | Soc. Develpm. Chart | 11.8760** |
| Hazard concept | Soc. Develpm. Chart | 15.3275** |
| Controls anger | Soc. Develpm. Chart | 10.7923** |
| Drawing of square | Presch. Inventory | 7.2372** |

Note.--All items tabled are at least at the .05 level of significance.
**Significant at the .01 level.

Table 33

Sex by Race Analysis
(Male White vs. Male Negro)

| Examination Item | Instrument | Chi Square |
|---|---|---|
| Male White > Male Negro | | |
| What pulls the train - the engine or caboose? | Presch. Inventory | 6.6441** |
| Male Negro > Male White | | |
| Jungle gym | Phys. Develpm. Chart | 9.7765** |
| Hopping on one foot | Phys. Develpm. Chart | 11.9539** |
| Somersault | Phys. Develpm. Chart | 11.4584** |
| Clapping to rhythm | Phys. Develpm. Chart | 13.3604** |
| Push-pull activity | Phys. Develpm. Chart | 12.7744** |
| Marches to rhythm | Phys. Develpm. Chart | 5.9640 |
| Catches bounced ball | Phys. Develpm. Chart | 5.5968 |
| Bell | Percept. Develpm. Chart | 12.0344** |
| Lemon | Percept. Develpm. Chart | 5.5336 |
| Soda-soda | Percept. Develpm. Chart | 4.0811 |
| Soda-graham | Percept. Develpm. Chart | 7.4423** |
| Apple-apple | Percept. Develpm. Chart | 5.0626 |
| What school do you go to? | Presch. Inventory | 10.3192** |
| What day is today? | Presch. Inventory | 5.1551 |

Note.--All items tabled are at least at the .05 level of significance.
**Significant at the .01 level.

Table 34

Sex by Race Analysis
(Male White vs. Female Negro)

| Examination Item | Instrument | Chi Square |
|---|---|---|
| Male White > Female Negro | | |
| Patience: rectangles, Year V | Stanford-Binet | 6.2331 |
| Stutters or stammers to point that it is difficult to understand him | Psychol. Screening | 4.8930 |
| Selects activities | Soc. Develpm. Chart | 4.7949 |
| Increases contacts | Soc. Develpm. Chart | 9.6357** |
| What do we call the first car of a train? | Presch. Inventory | 4.6800 |
| Female Negro > Male White | | |
| Is lethargic or apathetic; has little energy or drive | Behav. Inventory | 4.3488 |
| Complete inability to interact with strangers | Psychol. Screening | 5.0930 |
| Names colors | Ment. Develpm. Chart | 4.1762 |
| Hopping on one foot | Phys. Develpm. Chart | 10.8625** |
| Somersault | Phys. Develpm. Chart | 4.6145 |
| Clapping to rhythm | Phys. Develpm. Chart | 11.8884** |
| Push-pull activity | Phys. Develpm. Chart | 12.3516** |
| Marches to rhythm | Phys. Develpm. Chart | 8.6827** |
| Carries liquid | Phys. Develpm. Chart | 7.7863** |
| Adult attention | Soc. Develpm. Chart | 8.7767** |
| Pleases adults | Soc. Develpm. Chart | 6.4145 |
| Hazard concept | Soc. Develpm. Chart | 5.0769 |
| Controls anger | Soc. Develpm. Chart | 5.5486 |
| Bell | Percept. Develpm. Chart | 5.6916 |
| Pencil | Percept. Develpm. Chart | 4.0849 |
| Soda-graham | Percept. Develpm. Chart | 4.7488 |
| Soap | Percept. Develpm. Chart | 10.4453** |
| Paste | Percept. Develpm. Chart | 4.9970 |
| Apple-orange | Percept. Develpm. Chart | 7.2059** |
| What school do you go to? | Presch. Inventory | 3.9174 |

Note.—All items tabled are at least at the .05 level of significance.
**Significant at the .01 level.

Table 35

Sex by Race Analysis
(Female White vs. Male Negro)

| Examination Item | Instrument | Chi Square |
|---|---|---|
| **Female White > Male Negro** | | |
| The unhappy child | Psychol. Screening | 6.1105 |
| Saying nursery rhyme | Ment. Develpm. Chart | 3.8619 |
| Counts 4 objects | Ment. Develpm. Chart | 6.0225 |
| Names colors | Ment. Develpm. Chart | 15.7750** |
| Shows colors | Ment. Develpm. Chart | 8.0662** |
| Naming 3 animals | Ment. Develpm. Chart | 12.8873** |
| Arranging pictures in sequence | Ment. Develpm. Chart | 4.7104 |
| Cuts with scissors | Phys. Develpm. Chart | 7.3046** |
| What is this? elbow | Presch. Inventory | 6.8567** |
| What color is this? purple | Presch. Inventory | 6.5726 |
| What color is this? brown | Presch. Inventory | 4.0523 |
| Printing letters | Presch. Inventory | 6.1272 |
| Drawing of square | Presch. Inventory | 8.5853** |
| Drawing of triangle | Presch. Inventory | 7.8095** |
| **Male Negro > Female White** | | |
| Unable to remain seated for more than five minutes at a time | Psychol. Screening | 3.9360 |
| The provocative child | Psychol. Screening | 7.3687** |
| The disruptive child | Psychol. Screening | 9.0300** |
| Jungle gym | Phys. Develpm. Chart | 11.6464** |
| Stomach roll | Phys. Develpm. Chart | 5.3882 |
| Somersault | Phys. Develpm. Chart | 10.8547** |
| Clapping to rhythm | Phys. Develpm. Chart | 3.9038 |
| Catches bounced ball | Phys. Develpm. Chart | 4.4762 |
| Similarities | Percept. Develpm. Chart | 4.1174 |
| Differences | Percept. Develpm. Chart | 5.8515 |
| Bell | Percept. Develpm. Chart | 14.3777** |
| Lemon | Percept. Develpm. Chart | 6.3022 |
| Soda-soda | Percept. Develpm. Chart | 6.9847** |
| Soda-graham | Percept. Develpm. Chart | 6.5440 |
| Soap | Percept. Develpm. Chart | 8.0495** |
| Apple-apple | Percept. Develpm. Chart | 7.1165** |

Note.—All items tabled are at least at the .05 level of significance.
**Significant at the .01 level.

Table 36

Sex by Race Analysis
(Female White vs. Female Negro)

| Examination Item | Instrument | Chi Square |
|---|---|---|
| Female White > Female Negro | | |
| Patience: rectangles, Year V | Stanford-Binet | 4.7290 |
| Naming 3 animals | Ment. Develpm. Chart | 5.5404 |
| Arranging pictures in sequence | Ment. Develpm. Chart | 4.4905 |
| Increases contacts | Soc. Develpm. Chart | 10.5556** |
| Female Negro > Female White | | |
| Picture completion: man, Year V | Stanford-Binet | 4.3378 |
| The disruptive child | Psychol. Screening | 5.5199 |
| Somersault | Phys. Develpm. Chart | 4.2662 |
| Marches to rhythm | Phys. Develpm. Chart | 4.5108 |
| Bell | Percept. Develpm. Chart | 7.4602** |
| Pencil | Percept. Develpm. Chart | 4.0129 |
| Soda-graham | Percept. Develpm. Chart | 4.1023 |
| Soap | Percept. Develpm. Chart | 18.9761** |
| Apple-apple | Percept. Develpm. Chart | 5.5353 |

Note.—All items tabled are at least at the .05 level of significance.
**Significant at the .01 level.

## Table 37

## Sex by Race Analysis
## (Male Negro vs. Female Negro)

| Examination Item | Instrument | Chi Square |
|---|---|---|
| | Male Negro > Female Negro | |
| Selects activities | Soc. Develpm. Chart | 4.5075 |
| Increases contacts | Soc. Develpm. Chart | 8.6852** |
| | Female Negro > Male Negro | |
| Names colors | Ment. Develpm. Chart | 9.3361** |

Note.--All items tabled are at least at the .05 level of significance.
**Significant at the .01 level.